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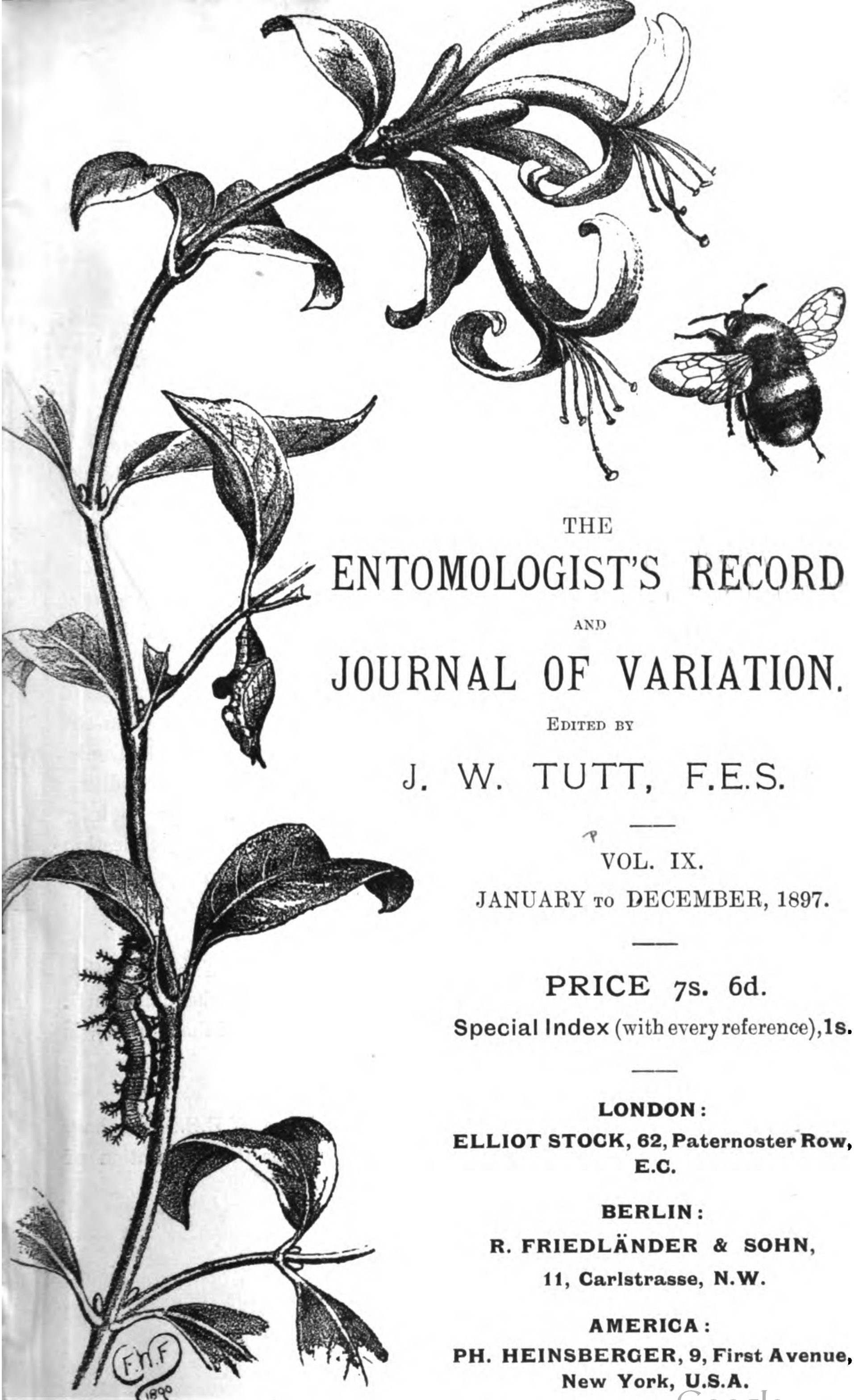

THE

ENTOMOLOGIST'S RECORD

AND

JOURNAL OF VARIATION.

EDITED BY

J. W. TUTT, F.E.S.

VOL. IX.

JANUARY TO DECEMBER, 1897.

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PREFACE TO VOL. IX.

On the completion of another volume we tender our heartiest thanks to our subscribers, contributors, and all those who have been in any way instrumental in increasing our circulation.

The return to the annual method of publication has resulted in the rejection of a great deal of material for which we could not possibly find room, in spite of the fact that the current volume is one of the largest yet issued.

We have attempted to make a fair selection of the material that has come to hand, and have done our best to cater for the different classes of our readers.

We have one important change to chronicle with regard to the management of the Magazine, *viz.*, that Mr. Horace St. John K. Donisthorpe, F.Z.S., F.E.S., will, in future, be responsible for the editing of all notes on Coleoptera that may appear therein. That we have got such an excellent helper is not only a great source of gratification to us, but must also be so to all our readers who are specially interested in this group of insects.

The large number of "Field Notes" for the different months, already in hand, leads us to state that this feature will be maintained. Already the material in our possession (for some of the months), is much more than we can possibly print.

Again we have to thank Mr. G. B. Routledge, F.E.S., who has, for the fourth time, made himself responsible for the preparation of the *Special Index*.

Vol. IX.

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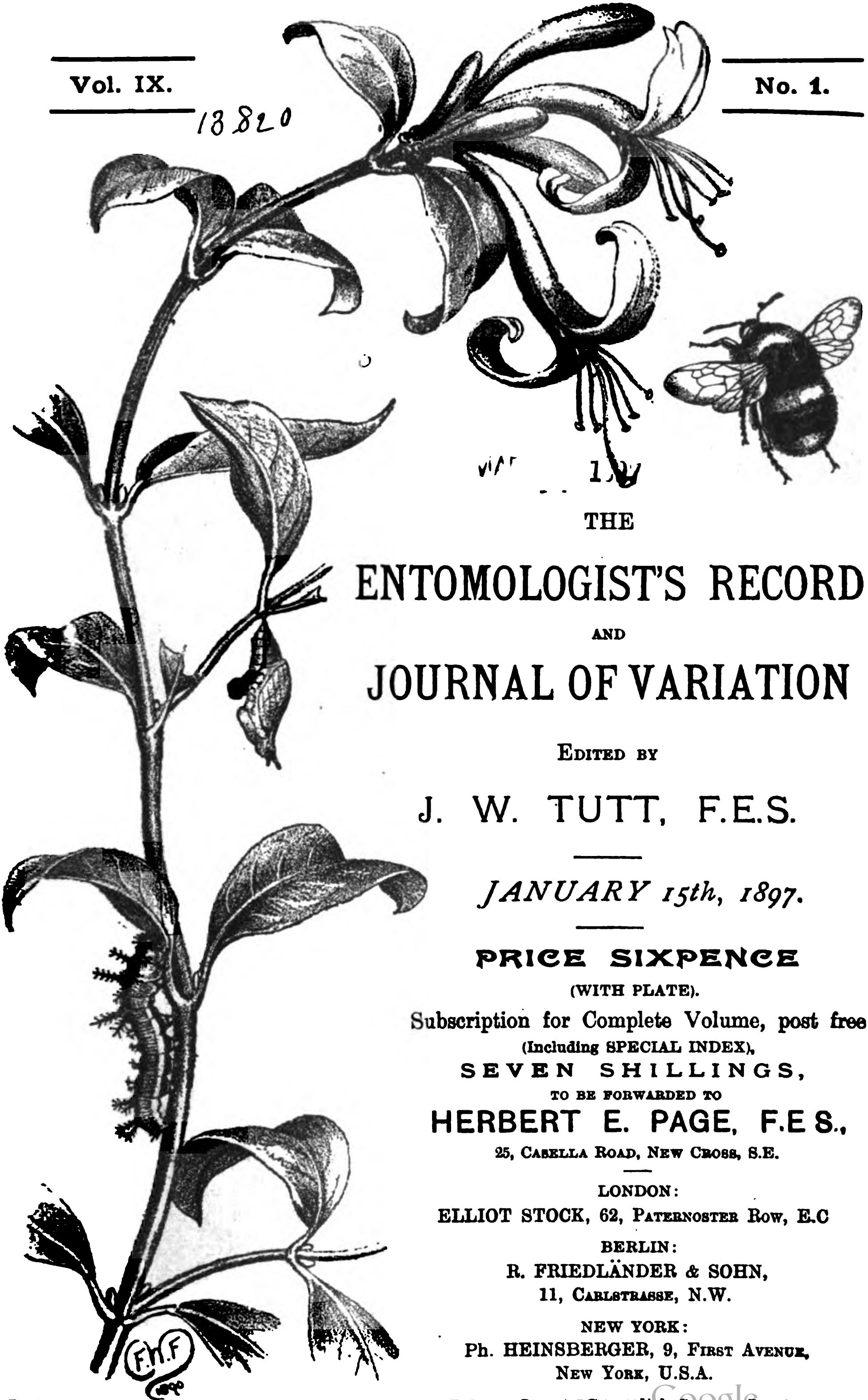

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I merely call attention to it as an important point that I had not previously noted.) Seven oblique stripes are present, the seventh being rather stronger than the rest; the sub-dorsal lines distinct. All the stripes are more conspicuous after the larva has been feeding for a few days. *Caudal horn:* long, pale pink; some of the larvæ have only short horns, which appear withered (in one instance almost to the stump), in another it is almost entirely absent, while a third has the horn constricted just above the base, as though a piece of thread had been tied round it. I have noticed a similar deformity to this last in a larva of *S. tiliae*.

Unfortunately, I had no larvæ of either *S. ocellatus* or *S. populi* in the first stage with which to compare, but, judging from memory and written descriptions, I noted as follows. The larva closely resembles that of *S. ocellatus* in shape and attitude, as well as in markings.

July 3rd. Most of the larvæ are now in 2nd skin, and are growing rapidly. July 4th. By this time I had larvæ of both *S. ocellatus* and *S. populi* in the same stage as the hybrid larvæ, so that the comparisons in this and subsequent stages are more exact. *2nd skin:* length three-eighths to five-eighths of an inch. *Head:* triangular, broader, less tall and pointed than in larva of *S. ocellatus*, but not so bulged at cheeks nor squat as in that of *S. populi;* yellow tubercles at apex of head taller than in the latter species. *Body:* scutellum indistinct; the sub-dorsal stripes are continued faintly across the oblique lines to the 5th (in one larva to the 7th); the medio-dorsal line is produced by the absence of shagreen tubercles; dark borders to oblique lines are present. The stripes are stronger than in *S. populi*, but not so marked as in *S. ocellatus*. In addition to the other stripes there is a faint lateral line below the sub-dorsal, on the thoracic segments. *Caudal horn:* the base is pink for about one-third its height; shorter and lighter in colour than that of *S. ocellatus*, though more marked in both respects than in larva of *S. populi*. *Habits:* The larva retracts the first two pairs of fore-legs (in one larva the third pair also); I did not note any marked preference for either the upright or hanging position in this stage; but one larva assumed a rather marked "sphinx" posture, very like that of *Sphinx ligustri*.

A careful examination of the larva proves it to be curiously midway between the parent species as regards most of the important differentiating characters. In shape and coloration it is neither so white a green nor graceful in form as the larva of *S. ocellatus*, nor is it so yellow-green and heavy-looking as the larva of *S. populi*. Looked at in a less critical manner, and without the aid of a glass, it reminds one most of the yellow form of *S. ocellatus*. Its habits and position, also, show rather more trace of the ♂ than ♀ parent. The fact of the 1st pair of oblique stripes being no stronger than the 2nd to 6th pairs, and weaker than the 7th, still further adds to its resemblance to *S. ocellatus*.

3rd skin: July 8th. *Head:* As before, nearly midway between the parent forms in shape, etc., but it now resembles *S. populi* more nearly than *S. ocellatus* in size, colour and roughness, being covered with yellowish tubercles, which are only very small in the larva of *S. ocellatus*; the large tubercles at apex are only slightly larger than in the larva of *S. populi*, with which they agree as regards colour (yellow); they are, however, situated, as in *S. ocellatus*, close together, and *not* a short distance apart with two smaller ones between, as is the case in the larva of *S. populi*. *Body:* becomes paler towards close of this stage, though not so white as *S. ocellatus*. *Stripes*: oblique stripes, as in *S. tiliae* and *S. ocellatus*, 1 to 5 equal, 6 narrow and weak, 7 strong and broad. The sub-dorsal line is faint and narrow, is continued backwards to the 7th oblique, but barely noticeable on thoracic segments; a double medio-dorsal stripe is faintly marked; the anus outlined with same colour as other stripes. *Caudal horn*: long and very thick at base. *Hairs:* still bifid, but this character is not quite so marked in the hybrid as in the larva of *S. ocellatus*. *Habits:* the larvæ rest either with the head downwards (*S. populi* habit) or with it upright (*S. ocellatus* position), with the first two pairs of fore-legs withdrawn, though not so completely as is the case in *S. ocellatus*.

One larva is growing to a large size in this stage, it is already over one inch long, and shows no sign of an approaching moult. The larva of *S. ocellatus*, when about to moult in this stage, is of about the same length as this larva now is, but it is not nearly so bulky. By July 12th there were only 19 living larvæ; three were well grown in the 4th skin, the remainder mostly in 3rd. They varied in colour from a yellow-green to a pale whitish sage-green, and were tolerably constant in shape, but very variable in size.

4th skin: July 12th. *Head:* as previously described. *Body:* the 7th oblique stripe is faintly continued forwards to the 3rd pair of pro-legs; the 1st oblique runs forward to the pro-thorax. The small oblique stripes that are present in *S. populi*, just above base of pro-legs 1, 2 and 3, can be faintly traced in the hybrid larva. The larvæ now mostly rest in the position taken by that of *S. populi*. Both yellowish and whitish forms are present in this stage. Just after the 3rd moult the yellow forms are superficially very like *S. populi* in its 3rd skin, the only striking difference being the absence of any strengthening of the 1st oblique stripes. *July 17th.* One is now nearly full grown, in 4th skin, while the majority of the remainder are about to undergo a 4th moult.

FULL-FED LARVÆ IN 4TH SKIN, July 17th.—*Head*: not so large or tall as that of *S. ocellatus* in 5th skin, and the yellow bands down the sides of the face are stronger and broader. The resemblance of the tubercles, and their position on apex, is remarkably close to *S. ocellatus* in everything except colour. This is, however, partly due to the fact that with *S. ocellatus* in the adult stage (5th skin) the tubercles or processes have greatly dwindled in size. *Body*: in colour it now almost exactly resembles a typical larva of *S. ocellatus*. The oblique stripes are now much stronger than when it first changed into this skin; the sub-dorsal is very weak and faint; the spiracles, bright red; in *S. ocellatus* they are deep crimson, and much larger. Anal flap outlined with yellow, in *S. ocellatus* with white. In general shape and habits it is still very similar to *S. populi*, and is restless under examination, as in this species. The larva of *S. ocellatus*, on the other hand, will usually retain its stiff and rigid resting position during the process, unless greatly provoked.

The first larva went down on July 21st, having only undergone three moults. By the 24th, the majority were full-fed, or nearly so, and the remainder, with one or two exceptions, were in the final stage.

So far as I was able to follow them, the majority had four moults, a few only attaining their full growth in the 4th skin.

The following are the CHIEF POINTS OF DIFFERENCE BETWEEN ADULT LARVÆ OF THE HYBRID AND THOSE OF S. OCELLATUS.—*Head*: smoother, and not so pointed; yellow lines down face much broader. *Body:* not so long and graceful; the sub-dorsal stripes much weaker; the oblique stripes not so strong; slight traces of small oblique stripes just above the bases of prolegs 1, 2 and 3 (these are altogether absent in *S. ocellatus*). *Caudal horn*: yellowish at upper end. *Spiracles:* not so large or dark; 1st and 2nd pairs of prolegs are retractile, but to a less extent than in *S. ocellatus.* Resting habits differ as a rule.

DIFFERENCES BETWEEN THE LARVA OF THE HYBRID AND THAT OF S. POPULI.—*Head:* taller and more pointed. *Body:* longer, and not so dumpy. *Oblique stripes*: rather broader. As in the larva of *S. ocellatus*, the stripes are due rather to colour than structure; the 1st no stronger than the following—2nd to 5th; the 7th runs forward to front of 4th pair of prolegs (as in *S. ocellatus*). Small oblique lines above base of prolegs present, but much fainter than in *S. populi. Caudal horn*: sky-blue in colour at base.

In its general appearance the larva, in the 1st and 2nd stages, approaches *S. ocellatus* rather than *S. populi*; in 3rd and early part of 4th stages it has a greater resemblance to *S. populi*; when full-fed it veers back again towards *S. ocellatus.*

A very similar change takes place in the larval life of *S. populi*, though perhaps this is not quite so marked as in the hybrid. It is in the middle stages (2nd and 3rd) that this larva attains its greatest distinctiveness; in the first and last stages the difference between it and the larva of *S. ocellatus* not being nearly so sharply contrasted, and this departure and return is in *no* way due to the development of *S. ocellatus*, which does not greatly differ in appearance throughout its ontogeny.

In the shape and structure of head, and the markings on its body, the hybrid larvæ were remarkably constant. I looked with especial care for any individual variation or difference in the oblique stripes; which it seemed not unlikely might vary in the direction of *S. populi*, by a strengthening of the 1st, but in *no* case was there the slightest tendency in this direction.

Throughout my notes I have made comparisons between the hybrid larvæ and those of the parent species, but with some characters the agreement with *S. tiliae* is as close as, or closer than, that with *S. ocellatus* and *S. populi*, and where this agreement is present, as, for instance, in the colour of the processes at the apex of head, we have, I think, conclusive evidence that this was their original appearance.

The larvæ were very delicate, more especially during the early stages, the moulting periods being the most critical of all. The less robust appeared to have great difficulty in getting rid of their old skin; I assisted them off with their old clothes in several instances, but, alas, in no case did my help prove of any avail, for they died in spite of my philanthropic efforts.

I suspect the difficulty really consists in drawing out the old linings of the tracheæ, the rough assistance one is able to render probably results in breaking them away from their attachment to the old skin, and leaving them to clog the breathing apparatus.

(*To be continued*).

Spring Lepidoptera at Hyères in 1897.

By (Rev.) C. J. BUCKMASTER, M.A.

I arrived at Hyères on April 28th last, left May 10th; stayed at the Gr. Hotel, Costabelle. On May 7th, there was a strong mistral, the other days were mostly fine—some of them very hot, with a maximum shade temperature of 80° F. The season appeared to be a decidedly forward one. I collected chiefly in the neighbourhood of Costabelle, on the wooded hills and among the quarries, but paid two visits (April 29th and May 8th) to Le Paradis, and one visit (May 5th), to the cork woods north of Hyères. The following species were captured :—

HESPERIDES : Hesperidæ.—*Spilothyrus alceae*: five (first on May 1st); Quarries. *Syrichthus sidae*; a pair in the Cork Wood Valleys, May 5th. (The heat here was intense, and after enduring it for about an hour, I had to regain the ridge for a breath of air). *S. sao*: pretty common throughout the district.

PAPILIONIDES : Lycænidæ.—*Callophrys rubi*: A few at Le Paradis, April 29th, but very worn. (No sign of *Thestor ballus*). *Chrysophanus alciphron* var. *gordius*: a lovely violet male, at Costabelle, May 7th. The day following, at Le Paradis, I took males with scarcely any violet suffusion, as well as females. *C. phlaeas*: a few noticed towards the end of my stay. *Lampides telicanus*: one very battered specimen, at Le Paradis, May 8th. I can find no record of so early an appearance of this species. Could it be a survivor from the late autumn brood? *Polyommatus baton*: two worn specimens, both males, at Le Paradis, April 29th. None seen there at my second visit. *P. astrarche*; a few. *P. icarus*: a few of both sexes, indistinguishable from my Swiss examples; no ab. *icarinus* observed. *P. corydon*: a few of both sexes. *Cyaniris argiolus*: one worn female only (May 8th). *Nomiades cyllarus*: the commonest blue throughout the district. My series consists of twenty males and two females. Size 1–1·3 in.; tone of colour varies from that of *P. escheri* to that of *P. icarus*. Underside is usually pearly grey, but in several specimens it is darker, approaching the brown of *N. melanops*. The powdering of the wing-bases is decidedly greenish-blue, but I can detect little or no trace of it on the fore-wings. The distinctive spots on the underside of the fore-wing are by no means constant; in some specimens they scarcely increase in size towards inner margin, and are inconspicuous. The row of small spots on the underside of the hind-wing is, in some specimens, completely effaced (the same specimens showing a corresponding *tendency* with regard to the spots of the fore-wing). In one example these hind-wing spots are complete on the one side, and wholly effaced on the other. *N. melanops*: four specimens, in poor condition, in company with *P. baton*, at Le Paradis, April 29th, not seen again. *Cupido minima*: one, at Le Paradis, May 8th.

Papilionidæ.—*Papilio podalirius* and *machaon*: Neither very common, and mostly in bad condition. I noticed their habit of flying round hill-tops at Le Mont Paradis. *Thais medesicaste*: a few, in a hollow in the Costabelle Woods, May 1st-4th, in good condition.

Pieridæ.—*Aporia crataegi*: Several taken in the Cork Woods, May 3rd and 5th. *P. brassicae* and *rapae*: the first butterflies I noticed on

April 29th, well out and common. *P. daplidice*: pretty common, but could not find any of the var. *bellidice*. *Anthocharis belia*: only five set, but believe it was pretty common. I confused this species at the time with *E. cardamines* ♀. *A. tagis* var. *bellezina*: what looks like a very diminutive *A. belia* is probably referable to this species. I took it on May 7th, and thought at the time that I had got *bellidice*. *E. euphenoides*: a nice series, including two females. Found it commonest in the Costabelle Woods, on May 1st, after which it became scarcer. *E. cardamines*: not so common, nearly all females. *Leucophasia sinapis*: common, the shading of the underside of the hindwings does not appear any darker than in that of my British or Swiss specimens, but the tone is decidedly *yellower*. *Colias edusa*: seen several times. *Gonepteryx cleopatra*: not very common, and all worn. (This was a great disappointment to me on my first visit to the south).

NYMPHALIDÆ: *Limenitis camilla*: Fairly common throughout the district, and in beautiful condition (fond of settling on foliage). *Eugonia polychloros*: one or two seen. *Euvanessa antiopa*: only one specimen seen, April 29th, and that a mere wreck. *Melitaea didyma*: rather common, and not more "fiery" than my Swiss examples. *M. cinxia*: commoner than the last, getting rather over. (I have not met with this species in Switzerland). *M. phoebe*: one taken on April 29th. *M. parthenie* (?): two specimens, large and fine. *Brenthis euphrosyne*: Several. *Melanargia syllius*: first seen on May 2nd, afterwards generally common. *Pararge megaera* and *egeria*: both fairly common, but worn. *E. janira* var. *hispulla*: males pretty frequent, but difficult to catch on the steep wooded hill-sides—one female, May 8th. *E. pasiphae*: a fine series, first seen above Hyères, on May 4th, afterwards occurring generally. *C. pamphilus*: one noticed on May 5th.

Among the very few MACRO-HETEROCERA noticed were the following:—*Zygaena lavandulae*: Pretty common on May 1st, booming about from flower to flower, on the summit of one of the hills behind Costabelle, and almost insensible to the effects of the cyanide bottle. *Acontia lucida* and *luctuosa*, *Erastria numerica*: single specimens. *Metoptria monogramma*: rather common; woods and quarries.

Melanic and intermediate aberrations of Abraxas sylvata (ulmata) in Yorkshire.

By WILLIAM HEWETT.

During the present season melanic forms of *A. sylvata* (*ulmata*) have been by no means rare in one particular locality in Yorkshire, and I have secured a number of these, as well as many intermediate aberrations, as the result of four visits paid to the district this season. Messrs. Maddison, Head, Walker and Dutton, have also obtained these aberrations in some numbers. None of them have been obtained from larvæ collected in the neighbourhood of York, as stated by one of your contemporaries, but all were secured in the imago state, occurring amongst the typical form which, in this particular locality, is found in profusion. I kept a number of melanic females (principally cripples) for eggs, which several deposited. The majority of these were fertile. Dr. Riding very kindly undertook to rear them, and, in a letter dated August 24th, says:—"I am glad to be able to write that almost all the *Abraxas sylvata* (*ulmata*) have gone down; there have been three or four pupæ on the surface, so there is little doubt but that the others that have disappeared into the cocoa fibre have pupated also. There are about ten larvæ still feeding, and I think altogether I have not found half-a-dozen dead ones. Not one 'spun a web in the tree' as stated by Stainton to be the habit of the genus *Abraxas*." I may add that Dr. Riding fed the larvæ on wych-elm. We are now looking forward to the rearing, for the first time, melanic forms of *A. sylvata* (*ulmata*) from the egg.

The history of these forms in this locality may prove interesting: Messrs. Head, Walker and myself have each collected in the locality for years, more especially whilst *A. sylvata* (*ulmata*) has been out, and although we have each made special search for aberrations, not one of us had ever observed a melanic specimen in this locality prior to the present year. The simultaneous appearance of a considerable number of this particular aberration in the same locality will, I firmly believe, save this fine aberration from the danger of being swamped by intercrossing, and completely refutes Professor G. J. Romanes' statement, *viz.*, "That the same variation does not occur simultaneously in a number of individuals inhabiting the same area, and that it is mere assumption to say it does." He further adds: "If the assumption were granted there would be an end of the present difficulty," *viz.*, the swamping effects of intercrossing, "for if a sufficient number of individuals were thus simultaneously and similarly modified, there need be no longer any danger of the variety becoming swamped by intercrossing." I do not believe there is any danger of this variety being swamped, but confidently look forward to its occurring in still greater numbers next season, and that intermediate forms will also be much more numerous.

Melanic forms of this species have only previously been recorded from Edlington Wood, Doncaster, where they are of extremely rare occurrence; I took one there some six years ago. I am also aware of its occasional occurrence at Drewton Dale, Yorkshire, and have in my collection a specimen of this aberration from that locality, obtained in 1895. Unfortunately, a large proportion of the melanic forms were cripples, or partially so, especially the left fore- and hind-wings. [Recorded also from Bamford Wood, near Rochdale, by Bentley, June 22nd, 1880.—Ed.].

Aberrations of Abraxas sylvata (ulmata).

By J. W. TUTT, F.E.S.

In the *Entom. Record.*, ix., pp. 268–269, Mr. Dutton records the capture of some aberrations of *A. sylvata*. These, I understand, were captured in a well-known locality, for this species, in Yorkshire, some twenty to thirty miles from the city of York. As he sent a picked selection of his captures for me to exhibit at the meetings of the various London Entomological Societies, I made the following notes on the specimens.

The specimens may be described as follows: (1) *Three* of the specimens are almost unicolorous, dark slaty-grey in colour, but with typical brown markings; the bodies are black. (2) *Two* of the specimens are uniformly dark slaty-grey, with the brown patch at the anal angle of the hind-wings, the patch on the inner margin of the fore-wing, and the basal area of the fore-wing, replaced by a dull greyish patch, tinged with ochreous; the bodies are black. (3) *One* specimen, similar to those first described (1), but with a series of pale longitudinal streaks just within the normal elbowed line; the body is black. (4) *One* specimen of a pale slaty-grey ground colour, with normal brown markings, parallel to those first described (1), but with paler ground colour; body almost black. (5) *One* specimen of the same form, with a clear, but narrow, white costal and inner margin to the fore-wings, and a white inner margin and pure white fringe to the hind-wings; the body suffused. (6) *One* specimen of the same form as those first described (1), but with whitish base to fore- and hind-wings; the body suffused. (7) *One* specimen with the outer margin of the left fore- and hind-wings dark grey, the right side normal. (8) *One* specimen with the hind-wings only, pale slaty-grey, and with the centre of the brown anal spot of hind-wings, and the inner marginal blotch of fore-wings, grey. (9) *One* specimen with the fore- and hind-wings with a series of longitudinal grey markings running along the sub-dorsal areas of both wings. (10) *One* specimen with the discoidal blotch continued as a band across the fore-wings; the outer (sub-dorsal) band also very strongly marked. (11) *One* specimen with the two transverse bands mentioned in the description of the last aberration (10) united into a broad band across the fore-wings.

The above aberrations are all more or less suffused with slaty-grey, or exhibit an extension of the normal slaty-grey or blue-grey markings. The following individuals, sent by Mr. Dutton, were suffused with dusky ochreous, or dirty cream-colour.

(1) *One* specimen with the ground colour of both fore-wings suffused with smoky cream colour; the hind-wings normal. (2) *Two* specimens, one with the right, the other with the left, fore-wing similarly suffused; the other three wings, in each case, normal. (3) *One* specimen with the fore-wings and the right hind-wing suffused at base, the dark-brown spots ill-developed, and the normal brown hue of these spots wanting. (4) *One* specimen with the left fore-wing dull smoky, the other three wings normal.

A single specimen presented the normal coloration, but had the dark brown spots and grey shades much reduced below the normal limit.

Porritt (*List of Yorkshire Lepidoptera*, p. 43) writes: "A peculiar lead-coloured form sometimes occurs, and many other beautiful aberrations have been taken. Edlington Wood is noted for aberrations of this species." At the meeting of the Entom. Soc. of London, on October 6th last, when Mr. Dutton's specimens were exhibited, he further remarked that melanic aberrations were not unusual, but that it was very exceptional for a large number to occur in any one year, as had been the case during the last summer.

Mr. Dutton (*ante*, p. 269) suggests that this unusual appearance of what is usually a rare form of aberration, is probably due to the malnutrition of the larva. This view is strongly supported by the fact, mentioned both by Mr. Dutton and Mr. Hewett, that a more or less large proportion of these forms were crippled, some having quite stumpy wings, others with only two wings moderately developed, and so on. Even the best of the specimens, so far as those exhibited allowed one to judge, had more or less crumpled wings, that had been flattened out by the setting brace.

One fact was very evident from the specimens examined, *viz.*, that the suffusion was not due to the spread of the normal slaty-grey shading on the wings, for, in the less deeply suffused specimens, these markings stand out distinctly, although in the darkest they are very inconspicuous or entirely lost in the ground colour. The intermediate stages also show that the darkening of the ground colour does not develop by the spread of the already existing slaty-grey blotches, but that it is a general modification of the scale structure which results in suffusion, the fact that the suffusion is of the same hue as the normal shading being quite fortuitous. It appears to be, in this respect, exactly parallel with the suffused aberrations of *Arctia villica*, *Nemeophila plantaginis*, etc., in which the normal ground colour is changed to a suffused black, through which the normal black spots show quite distinctly.

The poor physique of these aberrations suggests that, whether the crippling was the result of the larva being ill-supplied with food, or of some unfavourable condition to which the pupa was subjected, the prime factor in the production of these aberrations is one that spells "death" to the race, and hence this particular form of aberration is not likely to occur continuously in any great numbers. It may occur from time to time, even in abundance, if it be a species so easily and rapidly affected by external circumstances, as this extensive appearance suggests. If so, it is certainly a species for Mr. Merrifield's special attention.

On the other hand, in a district such as that where these specimens were captured, in which melanism would probably be useful to such a species as this, there might be sufficient cumulative force for heredity to produce such a race, but as this could only be done by means of the more vigorous specimens of the suffused form, the process would necessarily be a slow one.

I only know of one fact that makes me hesitate to accept the malnutrition of the larva as the direct cause for this sudden appearance of suffusion in so many specimens of this species, and it is, that I have on two or three occasions received larvæ from this locality and Edlington Wood, starved them most systematically, and never got a suffused variety, although the specimens only emerged about two-thirds the normal size. If it is not the food-supply that reduces the energy, and results in producing cripples and suffusion, what is it? Experiment is needed.

To make these aberrations recognisable without a separate diagnosis each time one is recorded, the following varietal nomenclature is suggested:—

1.—With the whole of the wings and body suffused with paler or darker slaty-grey = ab. *suffusa*, n. ab.

2.—With the wings, or some part of the wings, irregularly or unequally suffused with slaty-grey patches = ab. *intermedia*, n. ab.

3.—With the wings, or part of the wings, suffused with dirty ochreous or cream-colour = ab. *obscura*, n. ab.

4.—With the discoidal and central slaty-grey shades forming a central transverse band across the fore-wings = ab. *transversa*, n. ab.

Coleoptera in the winter.

By CLAUDE MORLEY, F.E.S.

By the end of October, the ivy blossom is over, and we have taken our Xanthias and our Thorns, and searched in vain (as usual) for our

Erythrocephalas and our Lambdas, and what are we going to do now? Are we going to sit down and arrange our cabinets for next season, varying the programme with occasional rambles in search of the twenty-odd species, many of them of the commonest, that alone are obtainable by the Macro-lepidopterist? Or shall we not rather expand our knowledge of this wonderful science of ours, and look more closely into those marvellous and, to us, perhaps somewhat contemptibly tiny beings, which go to make up the order COLEOPTERA? If we sufficiently bestir ourselves to do this, we shall very soon find that our erstwhile contempt was born, as is too often the case, not from the exquisite little creatures themselves, but from our own ignorance of this, one of the greatest and most varied of the British orders of the Insecta. The great advantage of the study of this order is that there are as many specimens, and perhaps even better species, to be obtained during the "closed season" of winter, than in the bright and genial warmth of the most glorious summer weather. This, in all probability, is not in reality the case, but only appears to be so, since many things abounding in May and June will be seen at no other time of the year, the majority, on the other hand, carry on a very spirited existence from the end of one August to the commencement of the next, thus living very much longer in the imago state than do any of the Lepidoptera, not excepting the hybernators.

A country ramble in November or December becomes a thing of some monotony to the lepidopterist, at all events in England, since his eye travels only from tree-trunk to paling and back—that is to say, of course, when searching for imagines. In pursuit of beetles—also imagines—however, there is not an object throughout a country lane which may not harbour "good things." The very earth of the hedge-bottoms teems with them, and the twigs of the hedge-tops afford great security against the inclemencies of the weather to the enclosed insects. The scattered leaves form a perfect hibernaculum, and the very palings are sometimes riddled, much to their detriment, by the borings of various *Teredilia* and *Scolytidae*. One of the very best ways of collecting in the autumn is from fungi. Many exceedingly rare things are to be obtained by visiting a wood—I always think fungi in woods the best kinds for this work—and shaking any pieces of fungus, which you will find the recent rains have caused to spring up abundantly on every side, over anything you happen to have with you, such as an umbrella, newspaper, sweep-net, or even one's pocket-handkerchief which answers the purpose very well and will always wash! The beetles principally taken by this means are *Brachelytra*, among which will be large numbers of *Homalota*, the largest genus of British Coleoptera, and one of the most difficult to identify, but besides these will be found a fair percentage of *Clavicornia*, with a sprinkling, perhaps, of *Geodephaga* and *Teredilia*.

Later, when the fungi have all disappeared, and the iron hand of winter has descended in stern reality, we may still wend our way, chisel in hand, to some lordly poplar or regal beech, and there spend a happy afternoon beneath an overcoat. For many of our very rarest beetles hybernate under the bark of trees, while others, being internal feeders upon the actual wood itself, do not, like the larva of *Cossus*, hybernate at all, but carry on their depredations, which thus become doubly injurious, throughout the whole year. I well remember spending three hours continuously cutting *Hylesinus crenatus* from the solid wood of a very tough and apparently quite healthy oak tree, with the temperature at 34°, and a keen nor'easter driving the sleet into my eyes with delightful persistency; but I took my series, and returned home rejoicing, under the shadow of a pipe, to a good hot tea! Mr. Woolley and many other coleopterists rave about beech as the best tree for winter beetles, and I should like to do so too, but there are none in these parts, saving such as stand in gardens or other too well cultivated spots. Personally I have always found willow trees best, for, if there is nothing especially choice, one at least gets a great number and often a fair variety of things; those trees which stand on the banks of streams should be worked with greatest success, since the semi-aquatic beetles, such as the *Prasocures*, invariably walk up something tall in order to avoid "February fill-dyke," and floods generally, and would in this respect appear wiser in their generation than *Chaerocampa elpenor*, most of whose pupæ must surely be drowned, as they lie among the lady's-bed-straw, in our flooded water-meadows, for perhaps six weeks or so.

Floods, by-the-bye, are the cause whose effect is another pabulum much affected by beetles, but this is generally after the new year has set in. The refuse, left upon the meadows by the sinking again of the waters, has been washed from the river-banks, surrounding ditches, and, in fact, whencesoever the flood was able to sweep it. This will be found a most prolific beetle-trap, and one that may be carried away in a sack or bag, and brought home for diligent examination, which is quite impracticable in the field, owing to the exceedingly minute species it invariably contains. Last February I took over a hundred and fifty species from a single bag of this rejectamenta, amongst which were twenty-three specimens of the very rare *Trachys troglodytes*, and, a day or two later, the fourth (I believe) British specimen of *Bagous diglyptus*, having taken the third at about the same spot a year previously. Bags of moss may be brought home in like manner from anywhere with good results, but preferably from the open places and glades in woods, and will be found to contain many rare things it is hardly possible to obtain, excepting by the merest chance otherwise. *Philonthus lucens*, one of our rarest species of the genus, is obtained almost exclusively by this means.

When in the transition stage between moths and beetles, I brought home a bag full of dead leaves from a spinny at Epsom, and was exceedingly elated to find curled up great numbers of *Otiorrhynchus picipes*, which I carefully carded and sought diligently to identify. I was equally fortunate in the other order, Lepidoptera, which showed up some half-dozen larvæ of *Noctua xanthographa!* Mr. Ford reminds me that about Christmas, or soon after, the water-net may be brought into requisition with advantage, if the winter be an open one, as good *Hydradephaga* and *Palpicornia* are beginning to emerge in our ponds and ditches, and by the middle of February the majority of those species which occur ubiquitously should be in full swing; but it is hard to specify a time for any particular species, for, though they undoubtedly emerge from the pupa in rotation year by year, no section of the Coleoptera is probably affected more by atmospheric influences. Altogether the coleopterist has a rather gay time in the winter, never feels that he cannot obtain new species to add to his collection simply by going out into the highways and hedges and culling them in by judicious working, and, moreover, the subject is so much wider (I am speaking of British insects), and the scope for experiment so very much greater, as to be extremely fascinating to those ambitious enough to tread its varied pathway.

Notes on the Rhopalocera of the Guildford district during the years 1896–7.

By W. GROVER.

The year 1896 was a somewhat abnormal one. In many localities the season was (as had been anticipated from the mildness of the winter) unusually forward; but, in others, the reverse was the case, the present district being numbered among the latter. Although the winter here was one of almost unprecedented mildness—both frost and snow being practically an unknown quantity—the spring species were later than usual, and from three weeks to a month later than in 1893, although the conditions were of much the same character as in that year. The long drought, which lasted practically from the beginning of April to the beginning of August (when both it and the summer came to a sudden termination), was, in many respects, very similar to that of 1893, but in 1896 the weather broke up suddenly in the first weeks of August, and after that, fine sunny days were very rare indeed. This, no doubt, accounted for the failure of some of the autumn species, more particularly the Vanessids, the almost total absence of which was the more noticeable after the wonderful abundance of so many other species during the long, dry summer.

On the other hand, 1897 must be considered in many ways a typical year, the winter being rather severe, compared with the previous one, but remarkable more for excessive rainfall than cold; and the summer showing to perfection that wonderful mixture of heat and coolness, sunshine and storm, which no other country in the world can show in the same degree as our own islands. The climatic conditions being so different, it is only to be expected that the lepidopterous fauna would show equal points of divergence, and the present year will chiefly be remembered for a late spring, and an unusually fine and sunny autumn, and also for the general scarcity of individuals of many species.

The district covered by this article is a strictly local one, being only that portion included within a radius of four miles from the town.

The geological formations of the district are both numerous and interesting, for so small an area, as will be seen from the following list, taking them in order from north to south: I. Lower Bagshot, sand, with patches of gravel and peaty bog. II. London clay, with extensive patches of Pleistocene sand and drift gravel; these, in some places, cover the clay to a depth of nearly fifty feet. III. Woolwich and Reading beds; these are only developed to a small extent. IV. Chalk, with a capping of clay and gravel (high-level drift) in many places. This formation occupies the central portion of the district, the town itself being situated upon it. V. Upper greensand. VI. Gault. The extent of both these is here very small. VII. Lower greensand (Folkestone and Hythe beds). These are both developed to a large extent, more particularly the Hythe beds. There is also a large inlier of Atherfield and Wealden clay in the latter; it is somewhat triangular in shape (the Wealden occupying the centre), and is nearly five miles in length from east to west, and about two in width at its widest part.

As may be gathered from the above, the physical geography is equally diversified. The river Wey flowing towards the N.N.E., intersects the district, dividing it into two nearly equal portions. The small portion of Bagshot sand included within the northern boundary of the district is low-lying land, being only a little over 100 feet above sea level; some portion is under cultivation, but the largest part is boggy moor. The London clay, on the other hand, is almost wholly under cultivation; it is also slightly more elevated, rising in some places to nearly 200 feet. The chalk is in parts cultivated (the capping of drift being chiefly occupied by woods of beech and oak), but by far the larger portion is bare down. At the eastern boundary of the district the chalk ridge attains an elevation of over 600 feet. The portion west of the river is a part of the well-known "Hog's-back;" it is very narrow, the strata being tilted up at such a high angle, that the northern slope is as steep as the southern escarpment; its highest point is just over 500 feet. The lower greensand is, to a very large extent, occupied by pine-woods and extensive heaths. The Folkestone beds rise very steeply from beneath the chalk; in one place they attain the same elevation as the latter (500 feet), although the horizontal distance between their respective summits is only about half a mile. The Hythe beds are cultivated to a much larger extent than the last; they are also less elevated, their highest points, which are capped by an outlier of the Folkestone strata, not rising much above 300 feet. South of our area, however, they rise above the Weald with a fine rugged escarpment, which includes some of the highest points in the S.E. of England. The Wealden inlier forms a tract of swampy common only slightly elevated above the level of the river; it is also covered to a large extent by river gravel, etc., deposited by that stream and its tributaries. There is little doubt but that it is the bed of an ancient lake.

HESPERIDES—Hesperidæ—*Nisoniades tages*, L.—1896: Not so common as usual, and late, not seen before May 11th. 1897: Rather scarce, and later, May 17th. *Syrichthus malvae*, L.—1896: Rather scarce, first, May 11th. 1897: Very scarce, May 17th. *Pamphila sylvanus*, Esp.—1896: Much scarcer than usual; 1897: Fairly common. In most years it is very abundant. *P. comma*, L.—1896: Commoner than I have ever noticed it before, and out early, the first being observed on July 23rd. 1897: Not common and late, August 5th. *Thymelicus thaumas*, Hufn.—1896: Common. It had been rather scarce for several years previous. 1897: Not common.

PAPILIONIDES—Lycænidæ—*Chrysophanus phlaeas*, L.—1896: Fairly common, but in nothing like the abundance in which it occurred in 1893. 1897: Fairly common. First and second broods very late. Third brood just out in considerable numbers on Oct. 5th, most of those observed being females. The first brood is always scarce here, and the few specimens obtained of it all agree with the ab. *intermedia*, Tutt, the fore-wings being brassy or golden instead of coppery. *Polyommatus corydon*, Poda.—1896: More abundant than I have ever seen it. The disproportion between the sexes was very great, the males being in a majority of at least thirty to one. 1897: Scarce and late. The typical greenish-blue male is scarce here; ab. *marginata*, Tutt, one or two—most of the specimens have the marginal bands of fore-wings pale, and marked with more or less distinct whitish rings; these seem to agree with the var. *hispana*, H.S.; others with bands dark and unspotted—ab. *caerulea-marginata*, Tutt—also occurred. Most of the females are typical, but a few of the ab. *aurantia*, Tutt, were met with. One very large specimen has the basal spots on underside of fore-wings absent, being thus parallel with *P. icarus* ab. *icarinus*. *P. icarus*, Rott.—1896: Very abundant. 1897: Not nearly so numerous. The males seem to be typical, the only variation being a slightly darker, more violet, blue in some specimens, and one with marginal dots on hind-wings—ab. *celina*, Oberth., taken June 17th. 1897: Some of the females agree with the ab. *iphis*, Baumh.; others have the base more or less lilac-blue, the amount of blue varies from a few scales in some specimens, to others in which it covers half the wing. Some fine examples occurred of the ab. *caerulea*, Fuchs, and also a few of the ab. *caerulea-cuneata*, Tutt. The typical lilac-blue female is scarce here, and I have not seen any for several years. Under-side males, one or two of the ab. *iphis*, Meig, occurred; also others intermediate between this and the type. Females, mostly typical, but one or two have the lower basal spot on fore-wings double. *P. astrarche*, Bgstr.—1896: Scarce. 1897: More numerous. Slight variation in depth of ground colour, some being much paler than others. The spots on the under-side vary considerably in size and number; the transverse row on fore-wings often consists of five, but usually of six spots, and, in one or two instances, there is a small seventh spot near the costa. A small female, taken on August 18th, 1897, is only ¾in. in expanse. *Cyaniris argiolus*, L.—1896: Abundant. As a rule, this species is rather scarce. The first brood was out in large numbers about May 9th—a late date; in 1894 it was well out by April 10th. Have never met with a second brood until 1896—it was out in far greater numbers than the first by July 15th; the females of this brood were very scarce. 1897: Rather scarce. First brood, April 26th, being thus earlier than last year. Second, only a few met with on August 5th. *Callophrys rubi*, L.—1896: Scarce, not seen before May 11th. 1897: Scarce, first May 17th. This only occurs in small numbers here.

PIERIDÆ.—*Pieris brassicae*, L.—1896: No specimens of the first brood were observed, and the second only occurred in very small numbers in July and August. As far as my own observations extend, this species was totally absent during the years 1894-5, and very scarce in 1893. Its reappearance is therefore interesting, as, previous to 1893, it was one of our most abundant species, its larvæ often doing a large amount of damage. 1897: First brood very scarce. Second fairly common. *P. rapae*, L.—Very abundant. It was very late, no specimens being seen until the middle of April. 1897: Abundant—later than last year, not observed before May 1st. *P. napi*, L.—1896: Very common, it was also rather later than usual. 1897: Much less common than usual. *Euchloë cardamines*, L.—1896: Very common, but rather late. 1897: Rather scarce and late, not observed until May 1st. *Gonepteryx rhamni*, L.—1896: Very common, as a rule it is rather scarce. Out early, several fresh specimens being seen on July 15th. 1897: Hybernated specimens very common in the spring, but it has been very scarce this autumn. On May 4th I was fortunate enough to observe a female depositing ova. She laid ten eggs while under observation (during a period of about 15 minutes). Most authors say the eggs are laid on the under side of the leaf, close to the midrib; but, in the present instance, the latter position was only chosen three times. Four of the eggs were deposited on the twigs themselves, close to the leaf, and quite three inches from a bud. When a bud is chosen, only a single egg is laid, as a rule, on each, but, in this instance, the remaining eggs were laid on a terminal bud, and all on the upper sides of the leaves.

NYMPHALIDÆ.—*Argynnis adippe*, L.—1896: A few worn specimens observed at the beginning of August. 1897: Not observed. *A. aglaia*, L.—1896: This species is very local here, but it occurred in fair numbers in its chosen locality. 1897: Only one (a worn female) noticed on August 14th. I was, unfortunately, unable to make any observations during July, so missed both these species. *Brenthis euphrosyne*, L.—1896: Very common, but rather late, not seen before May 11th. In 1893 it was out by April 19th. 1897: Very scarce, and late, not being out before May 25th. Only about a score seen altogether. *Vanessa io*, L.—1896: Only three hybernated specimens seen in April, and none in the autumn. 1897: Three or four noticed in August. It has been very scarce for several years. *Aglais urticae*, L.—1896: First brood abundant, well out by the first week in June. Second, rather scarce. Larvæ abundant. A large number bred from these, nearly all typical, but a few are more brightly coloured, and have the two central spots nearly absent, thus coming near the var. *ichnusa*, Bon. One taken on July 15th, is rather dark, and has the inner marginal spot joined to the central costal spot by a dark cloud, being thus intermediate between the type and the var. *polaris*, Stgr. 1897: Rather scarce. Larvæ of first brood not common, and about 50% of them infested with Dipterous parasites. Second brood not nearly so common as usual in August. Larvæ of third brood met with in considerable numbers on September 10th. They were in all stages, some nearly full-fed, the imagines from these are now (October 14th) emerging. The small ones, on the other hand, are not all full-fed yet; a few have pupated during the last day or two. *Eugonia polychloros*, L.—1896: One on August 5th. 1897: Only three seen, one in March and two in August. It is always scarce here, although it occurs in fair numbers a mile or two south of our area. *Pyrameis atalanta*, L.—1896: One on July 9th. In most years it is common enough. 1897: Scarce. About a dozen larvæ met with on September 10th; some of them full-fed, but others very small. Two imagines emerged from the former on October 14th; some of the latter, however, have only just pupated. The larvæ were exceedingly variable, the above small number including examples of all the four varieties figured by Hofmann, *Die Raupen*, 3, 12, a. b. c. d.

SATYRIDÆ.—*Pararge megaera*, L.—1896: Very common; the first brood was rather late, not being seen before May 20th. The second was more numerous than the first, and was out in large numbers by July 15th. This species had been less common for several years, but in 1896 it quite recovered its lost ground. 1897: First brood rather scarce. A female, taken on June 17th, has three secondary spots with white pupils on each fore-wing. They are in the position described by Mr. Tutt, *Brit. Butts.*, p. 393. Second brood very common, but little variation observed; a partial third brood occurred here in October, 1893, but nothing of the kind was observed in 1896, or in the present year, 1897. *P. egeria*, L. var. *egerides*, Stdgr.—1896: Very common, much more so than usual. It is difficult to say, with certainty, how many broods occur in a favourable year, but in 1896 four occurred here; the dates (which are, as near as possible, absolute, and refer to one locality only) being as follows: First brood, April 30th to June 2nd. Second brood, June 13th to July 6th. Third, July 18th to August 5th. (Fairly common, but much worn on latter date; possibly on the wing for some time longer, but none seen on August 20th). Fourth, September 14th. It was more numerous on the 16th, but after that the weather set in very wet and cold, and no more were observed. 1897: First brood, May 1st to June 12th. Second, June 17th to July 11th. (In fair numbers on the latter date, but all much worn). Third, August 14th to September 20th. Up to date no fourth brood has been observed. The males show considerable variation in the extent of the pale spots; some have them much reduced and more fulvous in shade, ab. *intermedia*, Tutt, while in one or two instances they are nearly obliterated altogether from the hind-wings. I have noticed that the females emerge with great regularity, about ten days later than the first males; they also remain on the wing for a much shorter period than the latter, disappearing after about twelve or fifteen days. The males, on the other hand, occur over a period of about five weeks in all the broods except the fourth. (Newman—who gives April 10th to 20th only—seemed to know less about this than some of the other species). *Hipparchia semele*, L.—1896: Occurred in fair numbers in several parts of the district—most numerous on the chalk and lower greensand, but it also occurred on a boggy moor on the Bagshot sand, where it seemed as much at home as on the dry stony hills, with which usually it is associated. The males show some variation in the extent of the pale markings, some have traces of a pale band on both fore- and hind-wings, and the orange spots on the latter large; of ab. *suffusa*, Tutt, a few, and of ab. *caeca*, Tutt, two or three. Some of the females are very large, and richly coloured, several being over 2½in. in expanse. 1897: Scarce, and much later than last year. *Epinephele janira*, L.—1896: Abundant 1897: Not nearly so numerous. Most of those observed were typical, but a number of males of the ab. *suffusa*, Tutt, were taken. *E. tithonus*, L.—1896: Very common, more so than for several years past. 1897: Much less numerous. Variation very slight. *Enodia hyperanthus*, L. —1896: Common, but less so than in some years; 1897: Rather scarce. It is always local here. The ocellated spots vary slightly in size and number, but nothing remarkable was observed. *Coenonympha pamphilus*, L.—1896: Not very common; which is rather remarkable, in most years it is, perhaps, the most abundant species found in the district. 1897: Very common. First brood late, not out until May 25th. Second, also very late, being only just emerging on August 30th. Variation slight, but one or two males of the ab. *lyllus*, Esp., occurred; the ab. *ocellata*, Tutt, also occurred in fair numbers.

The Genus Oporabia.

(*Concluded from* p. 286).

By LOUIS B. PROUT, F.E.S.

2*a*.—VAR. (?) (AUTUMNARIA, WEAV. =) ADDENDARIA, B.-WHITE.—Weaver (*Zoologist*, 1852, p. 3495) says that this is readily distinguished from *nebulata* and his *neglectata* (*i.e.*, large *nebulata*) by the glossy silver and fineness of the wings, and the slenderness of the antennæ; that it varies in size and in shade, some specimens being rather darker, but not without markings; and that it rests on branches of birch. He obtained a few in Perthshire in 1851, and very sparingly in previous seasons. He indicates nothing but its larger size, and its attachment to birch, to distinguish it from *approximaria* and *filigrammaria*. As regards the feeding on birch, Mr. W. Salvage says he meets with *nebulata (dilutata) only on birch*, and that the larvæ most certainly feed on that tree. Mr. Logan (*Zool.*, 1858, p. 6285) bred *autumnaria* (*i.e.*, *addendaria*) from birch, "the larvæ differing sufficiently from that of the common *dilutata*, but not," he suspected, "equally from that of *filigrammaria*, which had been reared the same season, by a Mr. Wilson, from larvæ on heath." Unfortunately, Mr. Logan does not describe the larva; nor does Mr. Gregson, who records that Greening bred a series from oak; and also that he himself bred a series of *approximaria* from birch. Evidently nothing definite can be gathered from the food-plants.

Mr. C. Fenn tells me that in June, 1875, he received, among a lot of larvæ from Rannoch, a few of an *Oporabia*, feeding on sallow, *Vaccinium*, etc., which Mr. Carrington considered *autumnaria*. He reared them, and the moths emerged at intervals from September 12th to the end of October; except, that they were a little more silky in appearance, they seemed to him, "true *dilutata*." In case, however, they were veritable *addendaria*, I quote the larval description, which he has kindly placed in my hands. "15th June, 1875. Elongate, slightly attenuated anteriorly. Head rounded, body with a few scattered short hairs. Colour green, with a greyish tinge on the back. Dorsal and sub-dorsal lines, and a faint thread between them, grey. A whitish spiracular band, only distinct on the posterior segments, where it margins the blunt anal flap. This spiracular band is shaded below with darker green than the belly, which is paler than the ground colour. Head pale green, dotted with brown." This description is, in some respects, intermediate between normal *nebulata* and *filigrammaria*.

Dr. Buchanan White admits that *addendaria* is very closely allied to *filigrammaria*, but considers there is a slight difference in the genitalia—a difference which unfortunately is not confirmed by Mr. Pierce's investigations. Dr. White only examined two specimens of each of these species, and the difference, as shown by his figures, was very slight, and perhaps due to some accident in preparation; at any rate, Mr. Pierce's numerous examples come between Dr. White's two extremes, and apparently yield nothing of importance for differentiation. It may, however, be useful for reference if I quote Dr. White's statements: "On the ventral hind margin of the last abdominal segment of a male *Oporabia* are two short spine-like processes. In *dilutata* these are rather near each other, and form short spines longitudinally striate near the tip. In *autumnaria* they are rather further apart and less distinctly spine-like, while in *filigrammaria* they are much flatter, and little more than tooth-like projections of the hind margin." I may add that the distinction of the first-named from the other two is again evident enough.

Dr. White adds little that is new as to the differentiation by wing-shape or markings, etc. His measurements, based on 21 specimens, give the size range from 34–41mm. (say 16–19 lines), with an average working out at just 37mm. For *filigrammaria*, his measurements, based on 15 specimens, give 28–36mm. (say 13–17 lines), the ♀s nearly always smaller than the ♂s; the average size works out at just 32mm. As regards form, etc., he considers that *addendaria* has more ample wings, especially in the female (sexes nearly equal in size), less concave outer margin, and, consequently, less produced apex. As regards markings, he mentions that *filigrammaria* has a greater tendency to suffusion, and also has often a more distinct and darker marginal band to the hind-wings.

Gregson apparently separates the two chiefly by the different localities in which they occur, and the different seasons at which they appear (*filigrammaria*, August—beginning of September; *addendaria*, October and November); but also appeals to the larger size of the last-named, the more elongate under-wings of the ♂ *filigrammaria*, and the great difference in the females. Unfortunately, the dates are very unreliable for different parts of the country, Dr. Buchanan White and Sir T. Moncreiffe giving August or the 1st of September onwards for *addendaria*, and September to October for *filigrammaria*. Buckler's notes (*Larvae*, vii., pp. 163–5), and Mr. Clark's (*Ent. Rec.*, viii., pp. 289–90) show how the dates for the larvæ may vary. My own Bolton *filigrammaria* this spring did not hatch till March 17th, though the Lancashire larvæ usually hatch in February, or even the end of January; and, as regards the lack of agreement between the imaginal dates and the imaginal characters, I would point out that even Mr. Gregson had to admit a difficulty. In the report of a meeting of the Northern Entomological Society (*Zool.*, 1859, p. 6354) he announces that he exhibited "a number of *Cheimatobia autumnaria (?)*, taken by Mr. Mawson, of Cockermouth, during the last week in October. This year they are like *Oporabia filigrammaria*, but as that species would pass away in September, at the very latest, they confirm what has been advanced at these meetings before, namely, that there is a good species allied to *O. filigrammaria*." I trust the sound logic of this argument will commend itself. I may remind my readers, by the way, that Mr. Clark's series, bred from a single batch of eggs, which hatched within a period of five days, emerged from August 5th to November 11th.

As regards the distribution of *addendaria*, little can at present be stated definitely. If it be a valid species, I should refer my Schneeberg specimen, and the other Continental examples referred to already, to this rather than to *filigrammaria*; this would give it a tolerably wide range. In Great Britain, I can only definitely give Delamere, and Dr. Buchanan White's Forth, Tay and Dee districts (*Scot. Nat.*, iv., p. 122). Mr. Porritt introduced *autumnaria* in his Yorkshire list as a variety of *dilutata*, but he informs me that the specimens in question proved to be merely "worn or dingy *filigrammaria*," which he used to take at lamps near the town (Huddersfield), and at rest on birch, etc., and which he now regards as "stragglers from their more natural habitat (the moors)."

Mr. Salvage is convinced that this is only a variety of *filigrammaria*, and Mr. McArthur also confesses that he cannot draw the line between them, though out of deference to Dr. White, he admits that they may be distinct. Actual intermediates do not seem to be very frequent, though Mr. Clark's series may perhaps be so regarded. Mr. Salvage writes me that the eggs he obtained, and from which Mr. Clark bred, were from true *filigrammaria*, taken among heather, at about 1,500ft. elevation. Is this perhaps a slip of the memory? Mr. Tutt is under the impression that he heard at the time that the eggs were from a lowland female.

2*b*.—VAR. (?) APPROXIMARIA, WEAV.—This must also be regarded as an intermediate form between *filigrammaria* and *addendaria*, as Weaver himself says (*vide*, *Ent. Rec.*, vii., 291). From the whole tenour of his remarks, I feel no doubt that it was simply a large variety of *filigrammaria*, with a preponderance of dark specimens. I do not know whether he suspected that they fed on the spruce fir; if not, there is really nothing but size to differentiate them from the type. Messrs. Gregson and Salvage have both mentioned the frequent occurrence of *filigrammaria* in fir woods *where heather grows*. It may be of interest to remark that Herr R. Püngeler, in a recent number of the *Stett. Ent. Zeit.* (in some "Mittheilungen aus der Schweiz") records *dilutata* at considerable elevation, the larvæ on *Pinus larix* tolerably different from the normal form, but producing imagines hardly differing from the type. It is a reasonable conjecture that these would belong to the *filigrammaria* group, but no description is given to aid the determination.

I doubt whether Mr. Gregson's present *approximaria* is at all the same as Weaver's. Mr. Gregson (*Zool.*, 1858, p. 6194) says that Weaver saw his series, and Weaver cites Gregson's MSS. It is therefore reasonable to assume that both writers were dealing with the same form. But Mr. Gregson's series was bred from birch, and his present idea of *approximaria*, as shown by two specimens named by him, and kindly sent by Mr. Pierce, is of a dark narrow-winged *nebulata*. Mr. Sydney Webb has the original series of Gregson's, and inclines to call them vars. of the last-named species. I therefore express with some diffidence, what is nevertheless my own very decided opinion (based on personal inspection), that they are a darker, less glossy form of the *autumnaria* of the same locality (Delamere). The only information that Mr. Gregson has published on his *approximaria* can be summed up as follows:—1st, That it occurs in Delamere Forest, about the same time of the year as *nebulata*. 2nd, That the larva feeds on birch. 3rd, That the hind-wings are elongate, and have the band running across them, not parallel with the cilia, as in *nebulata*. This characteristic of the hind-wings, however, is also adduced to *filigrammaria*, *autumnaria* (*addendaria*), and *precursaria*. 4th, That the form of the female is even more distinct from *filigrammaria* and *addendaria* than they are the one from the other.

Mr. Pierce has obtained from Mr. Gregson a little further information. I quote what Mr. Pierce has written me on the subject: "He (Mr. Gregson) says *dilutata* feeds on oak, and is bright velvety green;

approximaria on birch, and is not so velvety. *Approximaria*, as far as I can gather, is *dilutata*, fore-wings no object, but hind-wings are very narrow, and margin runs across the wing, and not parallel with the cilia. In *dilutata* this starts, in well set specimens, not from the anal angle of the hind-wings, but above, and runs at the same distance from the cilia all the way along the wing. In *approximaria* it starts from anal angle and runs across the wing, more like *filigrammaria*." Mr. Pierce's bred specimen (unfortunately, without history) seems to me to be a stunted and narrowed form of *nebulata*, and I should have thought, from the evidence of Mr. Webb's cabinet, that Mr. Gregson, in the olden times, would have referred it to his *precursaria*. It certainly does not belong to the *filigrammaria* group, and I have a bred ♀ from Epping Forest entirely agreeing with it. The captured specimen, named *approximaria* by Mr. Gregson, is certainly a normal *nebulata*, with which the genitalia perfectly agree, and could be matched by dozens of London specimens.

I am afraid I have trespassed most unwarrantably on your patience, and can only, in conclusion, reiterate the hope that I may have succeeded in stimulating a fresh interest in this perplexing genus.

On the habits of Metœcus paradoxus and Velleius dilatatus.

By W. H. TUCK, M.A.

Every autumn I am asked by many correspondents for specimens of the wasp-beetle (*Metoecus paradoxus*), which is very common in my district, in favourable seasons. I am of opinion that if the nests of its host, *Vespa vulgaris*, the small "anchor-faced" wasp, were more frequently examined in the proper season, the parasite would be often obtained.

With me it occurs in about a fifth of the nests I open. I have found 24, 12 and 8 in one nest, but 4 and 2 are the usual numbers, and then generally in pairs. I have taken 17 of the beetles this autumn, from seven nests, out of 24 examined—the first, August 2nd, the last, October 1st, which gives a pretty wide margin for search.

The life-history of this interesting beetle is still involved in much mystery, and although I have taken a large number at different times, I can offer no explanation upon the following points, *viz.*, why the perfect insect is seldom, if ever, found outside; how the female passes the time until she finds and enters the nest; and how the race survives when two or more wet seasons prove fatal to its host.

As far as I can ascertain, the female beetle—which probably lives underground—enters the nests from about the middle of July, and remains in them until they are sufficiently advanced to lay her eggs; and no insect is more irregular than this wasp, as I have seen plenty of nests from July to December.

The eggs are very soon hatched, and the grub grows rapidly, and having consumed a certain number of the wasp grubs, spins itself up in a cell side by side with the young wasp grubs—generally the males. The perfect insect appears to wait for some time in its cell, possibly in order that the wasps may liberate it by eating away the silken cap, and it is not difficult, by the aid of a good glass, to find the parasite, but in some cases the cap must be removed. When this is done, the beetle often runs out and flies away at once to the window. I consider that in about eight weeks from the date of finding the nest is the best time to open it up, as, if done sooner, no good result will follow, and if delayed too long the parasites all disappear, unlike the *Cryptophagi*, and other inquilines, which remain until the nest decays.

Another of our rarest beetles, *Velleius dilatatus*, breeds in the nest of the hornet (*Vespa crabro*). The proper time to take a nest is about the middle of October, as then all the sexes can be obtained, and the full-grown larvæ of the beetle. In 1896 I took a large nest from an oak tree, and found 18 queens, 26 males, and 53 workers, and several larvæ of *Velleius*, but I failed to rear any. Some years ago I found a perfect beetle and a good many larvæ in a nest of *Vespa germanica*, in a tree stump, which the year before had been occupied by hornets. The nest should be attacked in the day time, as the hornets work all night, and the hornets killed or stupefied two hours previously. They succumb very readily to any strong mixture, and the nest should be secured before the young hornets in the cells have time to develop, or the operation is attended with some danger. The nest, unlike any of the wasps', seems to be made from the scrapings of rough bark. I took a nest, this year, in a bank—a very unusual place, as the nests are generally to be found in old trees, or thatched buildings. In one nest, in a granary, I found a colony of *Lepisma saccharina*, the "fish" insect (which is known to infest kitchens), besides a good many *Cryptophagi* and other small beetles.

Some further notes *re* the Tephrosia hybrids.

By W. S. RIDING, B.A., M.D., F.E.S.

Following up my notes on this subject (*ante*, pp. 149-150; pp. 243-246; pp. 277-278), I would add that the pupæ of the hybrids have been kept during the autumn, either in a lumber room facing N.W., with open window, or in an outside larder. The insects continued emerging more or less during a period of over four months, and till recently; the last hybrid of ♂ *T. bistortata* + ♀ *T.* var. *delamerensis* appearing on October 22nd, two pupæ remaining at the present time; the last of ♂ *T.* var. *delamerensis* + ♀ *T. bistortata* about the middle of September, no pupæ left; the last of ♂ *T. bistortata* + ♀ *T. biundularia* on October 24th, two pupæ remaining[*]; and the last of ♂ *T. biundularia* + ♀ *T. bistortata* on October 21st, seven pupæ left.[†] The weather being now cold, and east winds prevailing, it is doubtful whether these pupæ will produce more imagines this year.

Of the pairings of the hybrids which yielded ova (June 13th-26th), as mentioned in a previous note, only some of the batches from ♂ (♂ *T.* var. *delamerensis* + ♀ *T. bistortata*) + ♀ (♂ *T. bistortata* + ♀ *T.* var. *delamerensis*), proved fertile, and these only partially so, a large proportion of ova shrivelling up. The larvæ fed during July, and the first week of August, and on August 8th, I find a note in my diary: "most of the hybrid larvæ, 2nd generation (*a*), reciprocal *T. bistortata* and *T.* var. *delamerensis*, gone down." On August 21st, the first imago appeared, whilst some of the larvæ were still feeding, and the insects have continued emerging occasionally till October 19th, when, there being two days of much warmer weather (nearly 60°), a ♂ and ♀ came out. These I paired, and ova were laid on October 21st and 22nd. The batch is a fairly large one, made-up, probably, of about 150. The ova are rather bright green, with slight bluish tinge. The average size is ·653 mm. vertical axis, and ·488 mm. transverse axis. Fifteen[*] pupæ of these broods, 2nd generation (*a*), are going over. On August 30th, I had previously paired two hybrids of the 2nd generation (α), and ova were laid on September 3rd. On August 31st, I again paired two more, which produced ova on September 4th. The ova from both these batches were yellowish-green, and the average size was ·693 mm. vertical axis, and ·471 mm. transverse axis. The first batch was infertile, the second hatched on September 18th-19th, and the larvæ are feeding in a warm room at the present time (October 25th), a few being in the 2nd stage, but most in the 3rd. Other hybrids were also paired, with the following results :—

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[*] These two pupae emerged on Oct. 31st and Nov. 3rd, respectively.

[†] Two of these emerged Oct. 30th and Nov. 1st, leaving five pupæ.

DATE OF PAIRING.	♂ PARENT.	♀ PARENT.	*re* OVA.	DATE OF HATCHING, ETC.
June 24	♂ *T. biundularia* + ♀ *T. bistortata*	♂ *T. bistortata* + ♀ *T. biundularia*	Rather bright green, with bluish tinge. Average size— ·647mm. vert. axis, ·462mm. trans. axis.	Infertile
,, 26	♂ *T. biundularia* + ♀ *T. bistortata*	♂ *T. bistortata* + ♀ *T. biundularia*	Colour similar to last. Average size— ·650mm. vert. axis, ·469mm. trans. axis.	Infertile
Aug. 9	♂ *T. bistortata* + ♀ *T. biundularia*	♂ *T. bistortata* + ♀ *T. biundularia*	*nil*	
,, 10	♂ *T. bistortata* + ♀ *T. biundularia*	♂ *T. bistortata* + ♀ *T. biundularia*	Ova laid on 12th. yellowish green, with partial bluish tinge, in mass, large. Average size— ·726mm. vert. axis, ·495mm. trans. axis.	4th week of August, some only fertile. On Oct. 22, all except 13, which were nearly full-fed, had pupated — 2*nd generation* (β)[†]
,, 13	♂ *T. bistortata* + ♀ *T. biundularia*	♂ *T. bistortata* + ♀ *T. biundularia*	Ova laid on 15th, colour similar to last. Average size— ·686mm. vert. axis, ·475mm. trans. axis.	Someonly, fertile — mixed with the larvæ of the last pairing—2*nd generation* (β)[†]
,, 20	♂ *T. bistortata* + ♀ *T. biundularia*	♂ *T. bistortata* + ♀ *T. biundularia*	Ova laid on 23rd, colour yellowish-green. Average size— ·594mm. vert. axis, ·444mm. trans. axis.	Infertile
Sept. 6	♂ *T.* var. *delamerensis* + ♀ *T. bistortata*	♂ *T. bistortata* + ♀ *T.* var. *delamerensis*	*nil*	

Oct. 25*th*, 1897.

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[*] One of these emerged Nov. 4th, leaving 14 pupæ to go over.

[†] Ten imagines emerged by Nov. 13th.

Sketch of the Life-history of Metœcus (Rhipiphorus) paradoxus.

By T. A. CHAPMAN, M.D., F.E.S.

The editor of the *Entomologist's Record* having asked me for a sketch of the life-history of *Metoecus* (*Rhipiphorus*) *paradoxus*, I make the following notes, perhaps not an undesirable thing, as my original contributions to the matter, in the *Annals and Magazine of Natural History*, are not very accessible to many entomologists.

So soon as it leaves the cell in which it is matured, the beetle leaves the wasp nest; no doubt this statement may require modification in regard to detention by weather, the observations, on which it depends, being that beetles are not to be found at large in the nest, beyond what may be assumed to have escaped from the cells between the times of taking and examining the nest, usually, in fact, none, occasionally, one or two. At large, they have been taken on flowers; but their chief occupation is oviposition. The eggs appear to be laid, and the beetles die within a few weeks of their escape. They pair readily in confinement, if placed in the sun with some vegetation and flowers.

As I failed to get them to lay in captivity, under a variety of circumstances, till I provided them with some half-rotten wood, deeply in the chinks of which the eggs were laid in little groups, I have no doubt that naturally the eggs are laid in the cracks and cavities of posts and other dead timber, such wood, in fact, as the wasps frequent to get their wood-pulp for paper-making, probably near the ground to prevent desiccation.

As I failed to get any eggs to hatch, I do not know the further history, until the following summer, that is, I do not know whether the eggs remain undeveloped all winter; whether the young larvæ develop in the autumn, but remain unhatched till spring; or whether they hatch in autumn, and find suitable hibernacula for themselves. These young larvæ are about one-fiftieth of an inch in length, little active black mites, very like the similar stage in *Meloe* or *Sitaris*, but shorter and broader. They, no doubt, meet with a wasp and attach themselves to it, when it is collecting paper material, but I have never succeeded in finding a wasp so infested, and only once saw the little mite at large in the nest. It must, therefore, very quickly transfer itself from the wasp that brings it in, to the larva that is its host. This larva is usually about half-grown when the *M. paradoxus* mite makes its way into the interior of the wasp-grub. It lies bathed in the larval fluids, and lives on these rather than eats anything. Here it may be found, generally in the flanks of the 3rd or 4th abdominal segments, until the time when the wasp-grub forms its cocoon, gradually increasing in size, until it reaches a length of 3-4 mm. The larva has not yet moulted, though it has grown so much, and still preserves the black dorsal and ventral plates, head, legs and anal suckers of the small active larva. These are now, however, widely separated by the extension of the intermediate membrane, and give the larva the appearance of an ordinary maggot with series of black marks. It is by aid of these series of marks that the larva may be seen through the skin of the wasp grub.

When the wasp-larva has completed the silken cap of its cocoon, the young *M. paradoxus* larva still possesses sufficient command of its jaws and legs to make an opening in the thoracic front (usually) of the wasp larva, and to come outside, where it may be found lying like a collar round the neck of its host. In the process of emergence it casts its skin for the first time, and the cast skin, with the hard black parts of the *Meloe*-like larva, may be found plugging the aperture of exit, which it does so effectually that nothing but the young *M. paradoxus* larva escapes thereby. For a time the *M. paradoxus* merely sucks the juices of its host through an indiscernible opening, afterwards, however, completely devouring the whole larva. During this period it moults once more, thus moulting twice altogether. It now completes its transformation rapidly, and is ready to emerge within a day or two of the wasps in the same row of cells. It is thus confined for pabulum to the one wasp-grub that it first penetrates.

A cell with *Metoecus* (*Rhipiphorus*) is usually easy to recognise; the dome of silk is that spun by the wasp grub, the *Metaecus* adding nothing, and, so far, it is identical with its neighbours; but when there is a full-grown *Metoecus* larva, or freshly-changed pupa, the cell has an ivory whiteness, contrasting with its neighbours; when the beetle (and wasps around) are nearly mature, it looks reddish, whilst those of the wasps are comparatively green. To find the young beetle larva still within its host, requires a careful search of wasp larvæ newly spun, and younger ones, down to half-grown: but the search is always successful in a nest fairly colonised by the beetle.

That some nests have no *M. paradoxus*, and others even many, is probably to be explained by the wasps of an affected nest frequenting a post for wood pulp that had been used by the beetle for oviposition; whilst the wasps of an unaffected nest do not happen to have come across such a post.

On the occurrence of Tephrosia crepuscularia (biundularia) in Ireland.

April and May being my busiest months, I have never really worked for these insects, except in 1895, when at Enniskillen. In that year I took 18, some whitish, and some brownish, and some slightly ochreous. Of these I have thirteen with me, which I have not labelled yet, one way or the other, and these thirteen are the only material I have here for reference. All the above I took at rest on trunks of fir, during May, as under:—May 1st, 2; May 3rd, 2; May 4th, 4; May 6th, 2; May 9th, 7; May 13th, 1; total, 18. I did not search for the insect after May 13th.—(Capt.) E. W. Brown, F.E.S., Dublin.

I have taken *Tephrosia crepuscularia* (*biundularia*) at Monaghan, and once at the Wooden Bridge, in Wicklow, when working sallows.* I do not appreciate the distinctions between the two insects; so far as I have observed, neither of the imagines occurs about here.—(Prof.) Hart, L.L.D., F.E.S., Woodside, Howth.

In 1895, I took *T. crepuscularia* (*biundularia*), first on May 5th, but heard of it being taken some days earlier; in 1896, I took it on May 3rd, and it was getting over on May 13th, the first week in May seems to be the time for it. It is found on the trunks of tall fir and larch trees, in a small plantation in a private demesne near here; a walk through the plantation may give four or five specimens, so it cannot be called common. I have seen no aberrations, and have not taken it in any other locality. The ground is quite low, I should think not many feet above the sea level. I do not think there is any other brood; I have never taken the ab. *delamerensis*. Of *T. bistortata* (*crepuscularia*) I know nothing.—J. E. R. Allen, Portora, Enniskillen.

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* The exact date of capture of this specimen would be interesting. Has Mr. Kane critically examined it?—Ed.

The difficulty relating to the Tephrosias under discussion arises from the various forms found in juxtaposition, and the extended limits of emergence of the Tephrosias in question in the British Islands, a comparatively narrow region. Now, in order to throw some light upon the subject, we should look to the Continent on one hand, and to Ireland on the other. On the Continent, it seems to me, the question has hardly been fully worked out, especially as to the time of emergence in different countries. I notice Berce gives *Tephrosia crepuscularia*, Hb., which he describes correspondingly to our *T. bistortata*, as having a double emergence, March-April, June-August. Guenée records a second species, *T. biundularia*, Esp., from the neighbourhood of Chateaudun, similar to the British. Guillemot records the former from Auvergne, as having a double emergence, and occurring in April and June. Hofmann likewise notes it as plentiful in Germany, etc., in April-May, July-August. *T. biundularia*, Esp., he sets down as a local English, very variable form, and gives a fig. of the ab. *delamerensis*. So far, therefore, we have evidence of a Continental species with double emergence, both in the warmer portions of France and Central Europe, and in the cold and ungenial climate of Auvergne, with its late spring and chilly autumn. This insect is undoubtedly found in Great Britain, and agrees both in pattern and emergences with our *T. bistortata*. Now, let us look across the Irish Sea. I can speak with some assurance, for I have met with it, often in abundance, in fourteen Irish counties, *i.e.*, Donegal, Derry, Down, Tyrone, Monaghan, Fermanagh, Sligo, Galway, Westmeath, Dublin, Wicklow, Wexford, Kerry, and Cork, and have examined collections from several other counties. All the specimens belong to the form named *T. biundularia*, Esp. The emergence is single. This is important, as in the south of Ireland the climate should produce a double emergence in any insect which exhibits such a tendency. I have, therefore, come to the conclusion that there are two species, and that the Irish one is distinct from *T. bistortata*. The only at all important variety found in Ireland comes from a locality in co. Down, where it was discovered by Mr. Watts, and approaches ab. *delamerensis*, though not so deeply clouded. As to the ancestral form of these species, one can only speculate; but as the females are generally lighter than the males, and approximate more nearly in the two species than the other sex, I should imagine that the stirps was a pale form like a light *T. biundularia*; and that the more highly coloured and deeply marked forms are later developments. I certainly agree with Mr. Porritt in naming all the Yorkshire examples I have seen, *T. biundularia*, and I hold that in the case of that species there seems to be an inherent conservatism in regard to a single brood, as shown in the south of Ireland. Undoubtedly it has a scanty April emergence in Ireland, as elsewhere, but I know of no earlier date than April 5th, although a collector worked in Sligo all through March, in a locality where it occurs; and, in Tyrone, I have collected by light all through that month for two seasons, nightly, but without meeting it, in a locality where it abounds in May, and I may add that these parts of Ireland are parallel as to climate with the portion of Yorkshire about Sheffield and Rotherham, where I have resided, except that we have somewhat more rain.—W. F. de V. Kane, M.A., F.E.S., Drumreaske House, Monaghan.

I have a fairly long series of a *Tephrosia*, from County Cork, that I have no hesitation in referring to *T. crepuscularia* (*biundularia*).—R. Adkin, F.E.S., Wellfield, Lingards Road, Lewisham.

The absence, up to the present, of *Tephrosia bistortata* (*crepuscularia*), in Ireland, is, indeed, remarkable. The distribution of this, and the closely allied species, *T. crepuscularia* (*biundularia*), when the whole of the Palæarctic region is considered, leads me to support Dr. Riding's suggestion that *T. bistortata* is the older form. I have seen specimens of this latter species from almost all parts of this area, whilst *T. crepuscularia* appears to be exceedingly local and restricted. The occurrence of the latter species in Ireland, north and midland England generally, and south of England locally, and apparent absence in Scotland and Scandinavia, is also very remarkable, and were we in possession of some reliable detail of the distribution of the two species in Europe and Asia, the results, I doubt not, would prove interesting. I trust Mr. Hewett's appeal for material from abroad has been, and will be, generously answered.—J. W. Tutt, F.E.S.

PRACTICAL HINTS.

On keeping Pupæ through the Winter.

During last winter and spring a discussion was carried on between some of the members of the Exchange Club, on the subject of keeping pupæ through the winter. The subject appears to us to be of such general interest to those lepidopterists who rear insects, that we have summarised the remarks made by some of those who discussed the matter, and now offer them to a wider public.—Ed.

To bring pupæ through the winter successfully requires experience, for what will suit one species may be the worst possible for others. As a general rule, the best plan is to place the pupæ in a cage or box with a leno covering. The floor of the cage should be covered with stones for drainage, and, on the top of this layer, about six inches of earth should be placed. Cover this with moss. Pupæ in cocoons should be laid on the moss. Above the moss, so as to cover the cocoons, lay four inches of loosely laid fern fronds. This is sufficient, also, to keep the extreme frost from naked pupæ. Leave the cage open (except for the leno) to the weather, and, as a rule, there will be no reason to regret the result. Leaf-spinning species should have the leaves kept moist. Moisture must never accumulate. Still, different pupæ often require different treatment. Some pupæ can hardly be kept too wet, others can hardly be kept too dry—so long as dryness and warmth do not go together. A few species, of which *Pharetra menyanthidis* is a good example, must be exposed to the weather if they are to emerge at their normal time. Vermin prey upon pupæ—mice, ants, Tineid larvæ (those of *Endrosis fenestrella* and *Œcophora pseudospretella*), and beetle larvæ are the worst, and a white fungus will often attack them. When this pest appears in an old cage the cage should be burnt at once.—C. Fenn, F.E.S., Lee.

As to keeping dug pupæ during the winter, I have found the following method most successful:—Knock the bottom out of a box some seven or eight inches deep, and replace with coarsely perforated zinc, or, better still, with wire gauze. Level the edges at the top, and cut a piece of glass to fit accurately. Place, on the zinc or gauze, inside the box, a layer of *Sphagnum* moss, pressed down till it is at least one inch thick. On this, place a thin layer of cocoa-nut fibre, and on it the pupæ, and cover them with about half an inch of the fibre. Between it and the glass lid place some sticks crosswise, from which the insects can suspend themselves when drying their wings. The box itself should be kept in position over a flat pan of water. The *Sphagnum* should be first plunged in boiling water, then dried, and very slightly damped before using.—W. S. Riding, M.D., F.E.S., Buckerell, Devon.

I leave all my pupæ (except those of *Eupitheciae* and other small Geometrids) in the pots in which they have pupated, covering the surface with a thin layer of moss. These pots I place outside in a covered shed, open to and facing the north, covering each pot with a sheet of glass. I leave the pots in this shed from the middle of October to the end of February or early in March, then take them inside the house, and occasionally damp the moss with tepid water. *Eupitheciae*, and other small fry, I place on dry sand in tins, covering them lightly with a layer of sand, and leave them in the shed all the winter, taking them indoors in March, and still leaving them in the tins, and not watering or damping at all. The very few butterfly pupæ I have are left in the ordinary breeding-cages, and kept indoors, but not too warm.—T. Maddison, South Bailey, Durham.

My method of keeping pupæ has been as follows:—I have a box (or, rather, several boxes) of wood, 18in. long by 12in. wide and 15in. deep, with hinged cover of glass, sloped from back to front. In the back and front a piece of wire gauze, 15in. by 5in., is fixed for ventilation. The bottom is of similar material (wire gauze). The box stands over a zinc tray of water the size of the box. In the bottom of the box I place a layer of moss, about 2in. to 3in. deep, and on this I lay the pupæ and cocoons. I keep the boxes in my study, where there is always a fire. The water under seems to give sufficient damp. I found, however, that pupæ got down through the moss to the zinc bottom, and I am now placing over the moss a thin layer of cocoa fibre, placing the pupæ on this, and over them putting a very thin layer of the fibre. Of course, I cannot say how this will answer. I tried keeping out of doors, but found it quite impossible to exclude earwigs.—E. F. C. Studd, M.A., B.C.L., F.E.S., Oxton, Devon.

Last winter I did not dig up my pupæ at all, but allowed the moths to emerge where the larvæ had gone down. I am inclined to think that I shall keep to this plan. So many pupæ that are dug up and interfered with, die, and I fancy that this is often because of their having been removed from their cocoons and natural site. The objection to leaving them alone is that the pupæ may be devoured, without one's knowledge, by the larvæ of Tineids, and different kinds of vermin. Last winter I had a number of flower-pots containing pupæ (perhaps 20 or 30). Only the pupæ in one of these pots suffered from the attacks of Tineid larvæ (or some other pest). I do not bake the earth into which the larvæ go down, because I do not know how to bake such quantities as I should want, but I sift the earth and mix it with sand. I do boil the moss, however.—W. M. CHRISTY, M.A., F.E.S., Watergate, Emsworth.

I never disturb my pupæ in the trays after going down, keeping them in a large emerging cage, fixed on the north side of my house. This cage is covered on three sides with garden-netting, and has a substantial top to keep out rain. I never damp them until spring.—J. MASON, Clevedon Court Lodge, Somerset.

I have tried many ways of wintering my pupæ. Now I always turn them out of their various pots, boxes, etc., lay the subterranean ones on silver sand, and put chopped moss over them, very lightly laid on. Those in cocoons I pin about on the sides of the cage. Those that are very small I put into small boxes, and stand on the moss, or pin on the side. I keep them in a bath-room that has no fireplace, and on mild damp days I frequently stand them on the window sill to get damped.—E. A. BOWLES, M.A., F.E.S., Waltham Cross.

The question of keeping pupæ is one which interests me greatly. I have tried leaving the pupæ alone, and I have tried moving them, and the conclusion which I have come to is, that in the cases of hybernating pupæ, the latter is better. I dig them up about Christmas, and lay them on sand under boiled moss, which I damp two or three times a week, except in frosty weather. This I have found quite successful. Those insects which pupate and emerge in the warm weather I leave quite alone, and rarely find them fail. All my breeding is done in ordinary flower-pots, half filled with sand. I use no earth, except such as is necessary for keeping potted food-plants in good condition.—J. C. MOBERLY, M.A., F.E.S., Southampton.

I keep my pupæ in a large meat safe with perforated zinc sides. It is placed out of doors, and has about 2″ of peat and soil at the bottom.—H. H. CORBETT, M.R.C.S., Doncaster.

HYBERNATING LARVÆ.—I always grow the food-plant for the larvæ required in large flower-pots, leaving these in the open with a piece of perforated zinc on top, which helps to exclude earwigs, and prevents the larvæ escaping—*Caradrina taraxaci* (*blanda*), *C. alsines*, and *Cerigo matura* larvæ fed all the winter of 1896, in this manner. For tree-feeding larvæ, I sleeve on growing trees, and fallen leaves help to protect them from severe frost. I have reared a large brood of *Pericallia syringaria* in this manner, also of *Acidalia inornata*, etc.—(Major) R. B. ROBERTSON, Cheltenham.

I find the greatest difficulty in hybernating larvæ, and have tried many schemes, but always with partial success only; the deaths being usually far above the successes, except in the case of a few things sleeved out on trees, such as *Geometra papilionaria*, *Phorodesma baiularia*, etc., which have always done well, but I have never had more than a very few larvæ of each.—T. MADDISON, South Bailey, Durham.

SCIENTIFIC NOTES AND OBSERVATIONS.

PROTECTIVE RESTING HABIT OF LITHOMIA SOLIDAGINIS, WITH SOME INCIDENTAL REMARKS ON OTHER SPECIES.—About the middle of August, *Lithomia solidaginis* was very abundant near Wilsden (Yorks). My brother and I have worked the district for the last 20 years, and never met with it until last year, when it was common, although it had occurred in the neighbouring valley, and one could hardly work a small piece of ground almost daily for years, without meeting it, if it had occurred. At rest it has a most remarkable resemblance to the excrement of groûse—the male particularly so. It folds its wings round the body, clasps a stone with its legs, and raises its body to an angle of about 30°. Its markings, colour, shape, and mode of attachment, make the imitation almost perfect.

The particular piece of ground where this species occurred consists of boggy heath, with dwarf fir, birch, oak, mountain-ash, etc., and is remarkably rich in insect and bird life. It has produced a large number of melanic forms, among others of *Larentia caesiata*, *L. multistrigaria*, *Amphidasys betularia*, *Phigalia pedaria*, etc. Among other species that occur in greater or less abundance, are *Hepialus velleda*, *Leiocampa dictaeoides*, *Pharetra menyanthidis*, *Agrotis agathina*, *Celaena haworthii*, *Orthosia suspecta*, *Noctua glareosa*, *N. dahlii*, *Hadena glauca*, *Venusia cambrica*, *Acidalia fumata*, *Scodiona belgiaria*, *Macaria liturata*, *Larentia olivata*, *L. salicata*, *Scoparia ulmella* (*conspicualis*), *S. truncicolella*, *Penthina sauciana*, *Peronea caledoniana*, *Amphisa gerningana*, *Grapholitha geminana*, *Paedisca occultana*, *Dichrorhampha herbosana*, etc.—J. A. Butterfield, B.Sc., 35, Wrottesley Road, Plumstead, S.E.

Hybernation of Vanessa io.—On December 30th, 1896, I met with *Vanessa io*, hybernating in a pile of wood. I took it indoors for the night; in the morning it was quite lively, and, when the window was opened, it flew quite vigorously. The weather was mild.—Ibid.

Influence of temperature on the hatching of eggs.—In March last, I divided a batch of eggs of *Trichiura crataegi* into two parts; one batch I kept in my vest pocket in a small glass tube, and these hatched in a few days (the first on March 29th). The rest, kept at the temperature of the atmosphere, commenced to hatch on April 14th. In April last, I similarly divided a batch of ova of *Catocala sponsa* into two portions, and treated likewise, carrying one portion in a small glass tube in my vest pocket, and exposing the other to the ordinary temperature of the atmosphere. The first hatched in five days, the other about three weeks later, on May 6th. The two lots of larvæ were kept separately, and the latter fed up more rapidly, so that there was little difference in the time they pupated. Ova of *Biston hirtaria*, *Ennomos erosaria*, *Orgyia antiqua*, etc., subjected in the same way to a higher and uniform temperature, hatched sooner than those exposed to the changes in the temperature of the atmosphere. Temperature is one factor in determining the time required for the development of the young larvæ, but not the only one. The ova of *Catocala nupta*, *Ennomos autumnaria*, etc., lie over the winter, while ova of *Triphaena fimbria*, deposited at the same time, produce larvæ in the autumn, although subjected to precisely the same conditions of temperature. We meet with similar periods of rest in the life of such a plant as the crocus. The young bud is formed underground in May, but the shoot will not develop till the next spring. An onion, or a potato tuber, will not develop its shoots in November, December or January, even under the most favourable conditions, but in March it will grow vigorously under apparently unfavourable conditions. Again, the sexually produced spores of some algæ and fungi do not develop for two, three, four, or six months. As in the case of ova, this must be due to some internal change, a change either in the embryo, or a change in the nutritive material. If it be the former, I do not see how we are to find what that change is, but if it be the latter it will be chemical. It may, for instance, be due to the fact that the embryo can only use this reserve material for food after it has been acted on by a ferment analogous to ptyalin, pepsin, etc., and that it requires a longer time for this ferment to be formed in the ova of *Catocala*, *Ennomos*, etc., than in those of *Triphaena fimbria*.—Ibid.

Breeding notes relating to Tephrosia bistortata and T. crepuscularia.—I am rearing three broods of Tephrosias. *Batch* I:—♂ and ♀, taken on larch trunks, at Leigh (Glos.), April 9th, 1897. April 10th: twenty-five ova laid, and moths paired again; April 13th, batch of ova laid; May 3rd, ova commenced to hatch; June 7th, larvæ began to go into moss; between June 29th and July 11th, 13 ♀s emerged; between August 29th and November 10th, 36 ♂s emerged (one or two per day). *Batch* II:—♂ and ♀, taken at Leigh Woods, April 27th, 1897: April 29th, ova laid; April 30th, paired again, and ova laid; May 23rd, hatched; July 2nd, gone in to earth and moss. *Batch* III, *T. crepuscularia* ab. *delamerensis*:—Ova from ♀ taken at Delamere Forest; laid May 3rd and 4th, 1897; hatched, May 3rd; July 1st, going into earth and moss.

The ova of Batches I. and II. were larger than those of Batch III. The ova of Batch III. were not only smaller, but yellower, and more shapeless than those of Batch II. The ova of Batches I. and II. were covered with "fluff." No "fluff" was received with ova of Batch III. The eggs of Batches II. and III. hatched same day, the larvæ of No. III. being distinctly smaller.—Chas. Bartlett, 58, Woodstock Road, Redland, Bristol. *Oct. 22nd*, 1897.

Note on Phothedes captiuncula.—I believe this species to be a true *Miana*, from my observations on its larva. It appears to me that *Phothedes*, as a generic name, will have to be dropped. It was given, of course, without knowledge of the larva of the insect.—J. Gardner, F.E.S., 6, Friar Terrace, Hartlepool.

Habits of Zygæna exulans.—This species abounded in the Tosa Falls Valley, from July 9th-16th, this year. The date of emergence turns largely on the melting of the snow. This year the snow was exceptionally deep. Going up the hillside, one first passed the imagines just emerging; then cocoons, either on stones, generally many together, or on twigs of rhododendrons—the food-plant; then smaller larvæ higher up, and, in the snow itself, young larvæ not yet melted out. I dug several from the snow.—W. Bateson, M.A., F.R.S., F.E.S., Norwich House, Cambridge.

Hybernation of Eugonia polychloros.—In regard to the spring appearances of *E. polychloros*, and the question of its being occasionally double-brooded on the Continent, referred to in the *Ent. Record* for October (p. 252), I should like to direct attention to a communication I made to the *Entomologist's Intelligencer*, so long ago as late in the "fifties," in regard to a brood of eggs I had from a captured female in September. A friend who was out with a picnicing party, at May Hill, ten miles from Gloucester, boxed a specimen of *E. polychloros*, and gave it to me the next day. To my surprise, I found a regular batch of pinkish-brown eggs inside the lid of the box, as well as the living specimen. These eggs hatched in a week or two, and I fed the little hairy caterpillars on the ground shoots of elm. I found similar larvæ on the shoots of an elm in a neighbour's garden, but none of the larvæ survived the winter.—J. Merrin, 2, Oakleigh Villas, Gloucester.

On the double-broodedness of Euchloë cardamines in Southern Europe.—On the subject of *Euchloë cardamines*, I notice that Mr. Tutt says that he "almost suspects that this species is partly double-brooded in the south" of Europe, some examples having been taken near Digne, in June, 1890. The fact of a double brood is affirmed positively in a note published by M. Brown, in *Le Naturaliste*, March 1st, 1880, p. 180. He records that, in the environs of Bordeaux, there are two appearances: (1) In March-April. (2) In June. He observes that there the two generations are very different: the first consisting of small and poorly-coloured examples; the second, large and more brilliantly coloured. Perhaps the individuals from near Cauterets, in July, are of the second generation, but this is uncertain, as the altitude of the town is 932 metres.—L. Dupont, Le Havre, France. *November* 18*th*, 1897.

On the specific distinction of Gonepteryx cleopatra.—I am not sufficiently familiar with *Gonepteryx cleopatra* to speak of its specific validity, but entomologists who have often observed this species believe it to be quite distinct from *G. rhamni*. Their flight is said to be not at all similar. The dates of appearance of *G. cleopatra* are April–May, and July–August, in Angouléme, according to my friend Dr. Vollantin (*Le Naturaliste*, 1880, p. 237). Angouléme is the most northern locality of this species in the west of France.—Ibid.

On the summer emergence of Gonepteryx cleopatra.—It may be of interest to record that a fresh brood of *G. cleopatra* was appearing in the gorge of the Guadalaviar, about 3,000 feet high, during the last week in July. The insects were very brilliant in colour. I had taken the species before, at Montserrat, during the second week of June, rather worn. On the Riviera, I used to get them at the end of March or early April, and on into May, in quantities; but I am not sure whether the species has two broods or only one—with different dates of emergence, according to height.—(Mrs.) M. Nicholl, The Cottage, Merthyr Mawr, Bridgend.

Probable double-broodedness of Euchloë euphenoides.—I am inclined to believe that *E. euphenoides* is double-brooded. When I was on the Col de Fangot, close to La Seyne, on July 4th, I saw *E. euphenoides* quite fresh. This was at an elevation of 5,000 feet. I also saw it on August 1st, on the diligence route from Briançon into Italy, quite at the top. This is about the same elevation. I was also informed by the well-known Swiss entomologist, Mr. Tasker, that he had occasionally taken *E. euphenoides* in Switzerland, in August, and he stated that these were of a second brood.—Ibid.

Notes on Rhodophæa rubrotibiella.—In the obituary notice of the late Mr. J. B. Hodgkinson, the editor makes the statement (*ante*, p. 126) that *Rhodophaea rubrotibiella* is "at best but a doubtful species," so a few lines on the subject may be useful. *R. rubrotibiella* is, it is true, closely allied to *R. tumidella* (the only species with which it could ever be confused), but, besides minor distinctions, the former has one very obvious characteristic, which, from its nature, makes it impossible that the insect can be identical with the latter: I refer to the thick transverse *ridge* of *raised scales* which stands on the dorsal half of the first line, and of which there is never any trace in true *R. tumidella*. So obvious is this difference, that the two species have been rightly treated as distinct by every author of note for the last half-century, and no one who is acquainted with both can possibly question the claims of either to specific rank. It is needless here to touch on the less important distinctions, both in the imagines, as well as in the larvæ. Although I have used the above names for these species, because the one name is used in the passage referred to, I would point out that in the *Ent. Mo. Mag.*, xxii., 27-28, the late M. Ragonot, in his "Revision of the British species of *Phycitidae* and *Galleridae*," dealt fully with the puzzling synonymy, and clearly showed that *E. rubrotibiella*, F.R., should be called *tumidana*, S.V., and *tumidella*, Zk., should be known as *zelleri*, Rag., both species belonging to the genus *Acrobasis*, Z.—Eustace R. Bankes, M.A., F.E.S., The Rectory, Corfe Castle. *September*, 1897.

Tinea ruricolella, Stn.—In the "Current Notes" (*ante*, p. 120), Mr. Tutt, referring to my remarks on *Tinea cochylidella*, Stn., in *Ent. Mo. Mag.*, Ser. 2, viii., 79-80, says that I am inclined to keep *T. ruricolella* specifically distinct from *T. cloacella*, "because" Mr. Machin bred some specimens of the former, and there were none of the latter among them. This statement, however, does not at all represent the true sequence of my ideas. My reason for considering them distinct is, as I there most clearly stated, that in the large numbers of specimens, showing extensive ranges of variation, that have been critically examined, I have always noticed certain differences which seem constant and reliable. Mr. Machin's experience in breeding *T. ruricolella* was merely mentioned by the way as affording some slight additional support to my opinion, which had been previously formed from other considerations.—Ibid.

VARIATION.

Melanic Thera obeliscata (variata).—About the middle of February I found a caterpillar of *Thera variata* descending a Scotch fir in Bostall Wood. The imago emerged with the ordinary spring brood, but was nearly black, darker than any Scotch specimen that I have seen. From the observations I have made on insects occurring in the London district, there seem to be as many species subject to melanism as in northern districts.—J. A. Butterfield, B.Sc., 35, Wrottesley Road, Plumstead, S.E.

Polyommatus astrarche ab. quadripuncta, Tutt.—I captured a few specimens of this interesting aberration, at Muchalls, Kincardineshire, in July last.—A. Horne, F.E.S., Ugie Bank, Beaconsfield Place, Aberdeen, N.B.

Nemeophila plantaginis ab. hospita and ab. rufa.—I noticed that Barrett (*British Lepidoptera*, vol. ii., Pl. 74, fig. 2c) figures a female *Nemeophila plantaginis*, with red hind-wings, as the female of the ab. *hospita* ♂. Is not this an error? Females with red hind-wings (ab. *rufa*) are not uncommon on the Kincardineshire coast, and in the immediate vicinity of Aberdeen, where, however, ab. *hospita* has never been known to occur. All the females that I have seen on the higher moors, where ab. *hospita* is found, have the hind-wings pale yellow, but not white, as in the males.—Ibid.

Melanic aberration of Eupithecia virgaureata.— *E. virgaureata*, in this country, has a melanic form very much like the ab. *angelicata* of *E. albipunctata*, and, I think, just as worthy of a distinct name. Mr. Richardson, of Weymouth, first showed me this form in his collection, and at the same time kindly told me where he got them. I have bred them from his locality, and also from this district, but in each case sparingly, not more than four or five per cent. I should be interested to know if the aberration has been found elsewhere.—H. W. Vivian, B.A., F.E.S., Glanafon, Port Talbot. [There are some interesting notes on melanic *Eupitheciae in Proc. of the Sth. London Soc.*, 1890, pp. 59-60; 1891, pp. 20-21 and p. 52.—Ed.].

Notes on the variation of British butterflies. — I have just obtained Mr. Tutt's very interesting new work, *British Butterflies*, and, although it is a long while since I paid any particular attention to the subject, I have jotted down the following notes:—*Chrysophanus phlaeas*.—The very striking ab. *fasciatus* should surely have been included. It occurs both in the European and American forms. There is also a v. *chinensis*, Feld. *Polyommatus corydon* ab. *minor* was named in *Entom.*, July, 1889. *P. bellargus*.—Nothing is said about the black ♂, ab. *niger*, *Entom.*, Jan., 1889. Does Mr. Tutt doubt the sex reference? *Polyommatus icarus* v. *rufina* (Oberthür) was described in 1894 (*Etudes Ent.*, xix., p. 14, pl., vi., fig. 52). I have not seen the description. *Colias hyale* ab. *pallida*.—This name was used by Robson and Gardner, in their 1885 list, for a whitish-yellow form of the female. Apparently Mr. Tutt must re-name his ab. *pallida*, though I infer that he does not consider that of Robson and Gardner to possess valid distinctive characters. *Colias edusa* ab. *suffusa*.—This name was used previously for a form of *C. edusa*. (See *Entom.*, March, 1889). *C. edusa* ab. ♀ *obsoleta*.—This is a synonym of *pseudomas*, *Entom.*, 1889, p. 26. *Pieris rapae*.—I do not know who was responsible for the extraordinary "explanation" (*Brit. Butt.*, p. 235) about this insect and *P. protodice*, but it is, of course, absurd. The two insects are so different, that Scudder now places them in different genera. *Pyrameis cardui*.—The small form is ab. *minor*, *Can. Entom.*, 1890, p. 57. To the list of food-plants of *P. cardui* add *Sphaeralcea angustifolia*, on which I found a larva at Las Cruces, New Mexico, May 26th. Also hollyhock, to which the larvæ are sometimes quite injurious at Las Cruces. I once found a single larva on a chrysanthemum, close to some hollyhocks. *Pyrameis cardui* is one of the butterflies which visit the flowers of the plum-trees during the first half of April, in the Mesilla Valley; last year it was particularly abundant, and with it numbers of *Peridroma saucia*, another British insect, as well as several *Heliothis armigera*, and a few *Anosia archippus*. The plum-flowers, besides attracting these lepidoptera, were visited by a remarkable series of bees, mostly *Andrena*, including many new species. *Coenonympha typhon* var. *laidion*.—Another synonym of this is v. *orcadae*, Robs. and Gard. *C. pamphilus* ab. *pallida* appears to be a synonym of ab. *albescens*, Robs. and Gard., 1885.—T. D. A. Cockerell, F.Z.S., F.E.S., Mesilla, New Mexico, U.S.A. [I am indebted to Professor Cockerell for the synonyms which have been overlooked. There are some dozens of named forms, possibly, occurring in various parts of the world, of our British species, not included in the work mentioned. The MS.

would probably have run to 1,500 pages instead of nearly 500, and I had to cut down.—J.W.T.]

Aberrations of Diurni.—The following aberrations have been taken during the last few years in this neighbourhood:—(1) *Lycaena arion.*—A very small specimen, $1\frac{3}{16}$ inches in expanse, taken with the ordinary forms on the Cotswold Hills, a few years since, towards the middle of June, after a dry spring, which probably stunted its food-plant. (2) *Aglais urticae.*—I have a specimen remarkable in having a silvery spot on the costa of the fore-wings beneath, and occupying the centre of the third black costal blotch (the one nearest the base). It was bred from a larva fed up with a large number of others, which produced only the ordinary type. (3) *Syrichthus malvae* ab. *taras.*—A specimen with the central area of the wing marked with a distinct band of white blotches. The hind-wings with only a minute central white spot, and faint traces of subterminal band. (4) *Enodia hyperanthus* ab. *caeca.*—A specimen with only a series of white points on the underside of the hind-wings, and three ill-defined ocellated spots on the underside of the fore-wings. It, therefore, agrees with the ab. *caeca* on the hind-wings, but not on the fore-wings.—J. Merrin, Gloucester.

Aberrations of noctuid moths from Navestock, Essex.—I have taken the following aberrations here this season: *Xylophasia hepatica* ab. *characterea*, one only; *Agrotis exclamationis* ab. *picea*, rather scarce, four or five only; *Noctua xanthographa* ab. *cohaesa*, very abundant, far more so than the type; *Anchocelis pistacina* ab. *serina*, scarce, six only taken; *Miselia oxyacanthae* ab. *capucina*, dark, and very abundant, quite outnumbering the type; *Cidaria russata* ab. *perfuscata*, one only.—(Rev.) W. Claxton, Navestock Vicarage, Romford.

Aberrations of Abraxas sylvata (ulmata).—I have, I believe, a form of this species rather different from any captured by Mr. Dutton. It is a male of the light form, that has the fore-wings only splashed with the leaden-blue colour, the suffusion occupying the centre of the wing. I consider it a very striking form.—S. Walker, Eddercliffe, Queen Anne's Road, York.

NOTES ON COLLECTING, Etc.

Note on Plastenis subtusa.—In the first week in August I took *Plastenis subtusa*, somewhat freely, near Wisbech, both at sugar and at rest, among the ivy on five large poplars. One always expects to meet with this species (and *P. retusa*) more readily in the larval stage earlier in the year. Of course, one takes it occasionally at sugar, but not freely.—J. A. Butterfield, B.Sc., 35, Wrottesley Road, Plumstead, S.E.

Sirex juvencus in Bostall Woods. — Last autumn, I found a female *Sirex juvencus*, in Bostall Woods, with its ovipositor firmly fixed in a larch tree, evidently in the act of ovipositing.—Ibid.

Chœrocampa celerio in Shropshire.—Mr. G. Potts, of Broseley, Salop, caught a very fine ♀ *C. celerio*, while it was hovering over some fuchsias in his garden, at dusk, last Monday (Oct. 18th). Mr. Potts, who most generously gives away his entomological captures, was good enough to present the insect to me, and I had the pleasure of setting it yesterday. The specimen is in such fine condition, that it seems hard to believe that it was bred abroad. This species is double-brooded in Southern Europe, appearing in early June, and again in September; it seems to me most probable that a few insects of the first brood find their way to this country, and become the parents of the specimens which appear, now and again, in various parts of Britain. This may well be so, for the larva feeds not only on vine (*Vitis vinifera*), but also on lady's bedstraw (*Galium verum*). I have repeatedly taken the insect abroad, but this is my only English specimen.—F. B. Newnham, M.A., Church Stretton. *Oct.* 22*nd*, 1897.

Collecting in the Brampton district (Cumberland), 1897.—The season here has been a very bad one. The sallows produced *Panolis piniperda* (two only), several red forms of *Pachnobia rubricosa*, while *Taeniocampa gothica*, *stabilis*, and *pulverulenta* were very common. *Taeniocampa incerta* was not so common as usual, and they were all of var. *instabilis* form. Among the Geometers during March, I only noticed *Hybernia marginaria* and *Larentia multistrigaria*. On April 6th, *Melanippe fluctuata* appeared, and sallows produced insects until April 20th. The month of May was not very productive, as *Cidaria suffumata*, *Anticlea badiata*, *nigrofasciaria*, and *Coremia unidentaria*, were the only species obtained. During the month of June, insects were more plentiful. *Dicranura vinula*, *Lomaspilis marginata*, *Cidaria silaceata*, *Cabera pusaria*, *exanthemaria*, *Acidalia remutata*, being frequent. Insects were attracted by sugar from June 15th to July 7th, during which time *Agrotis exclamationis*, *segetum*, *Xylophasia monoglypha*, *Miana strigilis*, and *Noctua plecta*, were very abundant, whilst *Pharetra rumicis*, *Hadena thalassina*, *adusta*, *Apamea basilinea*, *Noctua c-nigrum*, *Mamestra brassicae*, *Leucania comma*, and *L. pallens*, were not so abundant, and of *Thyatyra batis*, *Pharetra megacephala*, *Acronicta leporina*, *Xylophasia hepatica*, *Grammesia trigrammica*, *Noctua festiva*, *Hadena contigua*, only single specimens were taken. After July 7th, insects were not nearly so plentiful at sugar, owing to the great heat. *Phibalapteryx lignata* turned up for the first time on July 1st, only three specimens were taken, however; these were flying at dusk. A number of green Geometrid larvæ were swept from bilberry, which afterwards turned out to be *Larentia didymata*. *Hypsipetes sordidata* larvæ were very common on the sallows, only a very few were found on bilberry. On July 8th, *Enodia hyperanthus* appeared; about 10 per cent. were the ab. *obsoleta*, Tutt; another specimen had the ocellated spots on a pale band. August was not very productive. *Hepialus sylvinus*, *Geometra papilionaria* (two), etc. *Pyrameis cardui* appeared on August 31st, in this locality, after an absence of some years. September was a complete blank, and only *Calocampa exoleta* has been taken, at sugar, in October.—G. B. Routledge, F.E.S., Tarn Lodge, Head's Nook, Carlisle.

Notes from Farnborough.—I have seen living *Polia flavicincta*, captured at Bexley, this year. Here, my most welcome visitors have been *Mellinia gilvago*, *Tiliacea* (*Xanthia*) *aurago*, and a specimen of *Plusia moneta*, the first and last mentioned both being quite new to this district. The *M. gilvago* was captured on September 17th, sitting on a cherry tree close by, but not upon, a sugar patch.—Hope Alderson, F.E.S., Hilda Vale Road, Farnborough, Kent.

Sphinx convolvuli at Barnsley, South Yorkshire. — On September 6th last, I had a specimen of *S. convolvuli* brought to me by the owner of a foundry, situate in the centre of the town, who found it at rest on the wall of a workshop. Electric light is used on the premises, so no doubt that was the attraction. Unfortunately, when it reached me it had gone through the inevitable match-box treatment, and is not in the best of condition. This is the second Barnsley specimen I have.—J. HARRISON, F.E.S., 7, Gawber Road, Barnsley.

COLLECTING EUPITHECIÆ.—About the middle of October, 1896, after finding there were some *Eupithecia* larvæ on golden-rod, in this district, I collected a good supply of the plant, without troubling to look for individual larvæ. The plant was put into a big breeding cage, and kept in my room; but, as I was away from November to April, the temperature was probably not high most of the winter. At the same time I collected *Angelica* and yarrow from the same place. In April, *Eupithecia albipunctata* began to emerge from the *Angelica* and *E. virgaureata* from the golden-rod, and they continued to do so through the greater part of May. Towards the end of June and during July, *E. subfulvata* emerged from the yarrow. In June, *E. expallidata* began to emerge, and has continued to do so steadily till the present time. One emerged as late as October 5th. Altogether I have bred a fair number of this species. From the *E. virgaureata* that emerged in April, I obtained ova, which fed up on hawthorn, and emerged in August; so that it looks as if this species were regularly double-brooded.—H. W. VIVIAN, B.A., F.E.S., Glanafon, Port Talbot.

NOTES FROM READING.—XYLOPHASIA SCOLOPACINA IN DORSET.—In April and May, pupæ of *Sesia sphegiformis* were exceedingly scarce, but pupæ of *S. cynipiformis* were obtained more freely from oak. An attempt, on June 8th, to get *Abraxas sylvata* and *Asthena blomeri* resulted in the capture of one of the former species. In the early part of June, *Eupithecia plumbeolata* and *Dianthoecia carpophaga* were plentiful. On June 10th, *Lithosia mesomella* and *Acidalia subsericeata* flew freely at dusk. In the week ended the 26th, *Noctua festiva*, *N. brunnea*, *Grammesia trigrammica*, *Hadena genistae*, *Dipterygia scabriuscula*, *Aplecta tincta*, *A. nebulosa*, *Craniophora ligustri*, were amongst the visitors to sugar. Five journeys during the first seven days of July, for *Dicycla oo*, resulted in the capture of six imagines, one example being the ab. *renago*—a sad falling off from the total for 1896. Till the end of the month nothing of note was taken, except three *Xylophasia scolopacina*, one netted at dusk, one taken at sugar, and another beaten out. These were captured near Bridport, Dorset. *Pamphila comma* was numerous on the Berkshire Downs during the first week of August. Treacling this month was almost a failure. Four visits for *Noctua stigmatica* were rewarded by three poor specimens. On the 30th, *N. castanea* ab. *neglecta* turned up at sugar, after being an absentee for years. Sweeping heath and sugaring trees near, the same evening, did not secure *Agrotis agathina*. This is a great rarity in the district. *Tiliacea aurago*, *Mellinia gilvago*, *M. circellaris*, *Hadena protea* and *Asphalia diluta* were out on September 6th, and continued to come to sugar till the end, or nearly the end, of the month. *Epunda lutulenta* was taken on the 7th, and on subsequent dates a few more were obtained. The only *Cirrhoedia xerampelina* I got was taken on the 11th. *Orthosia macilenta* and *Miselia oxyacanthae* were fairly numerous the latter part of the month. The wind, at the beginning of October, went to due east and north-east, frosty nights prevailed, and for the time put an end to sugaring expeditions.—J. CLARKE, Reading. *October*, 1897.

HABIT OF APATURA ILIA.—I find that *Apatura ilia* comes to sugar, also that it flies low, and comes down in the early morning, from 8 to 10 a.m., and not towards 4 p.m., as Kane says.—E. S. HARRISON.

CAPTURE OF DEILEPHILA GALII NEAR HONITON.—I captured a specimen of this species during the first week of August, on either the 3rd, 4th or 5th, at dusk, hovering over a flower of the tobacco plant (*Nicotiana affinis*), in the garden of Stockland Vicarage, near Honiton, Devon.—F. S. DAWE, B.Sc., 13, Walham Grove, Fulham, S.W. *Oct. 10th*, 1897.

DASYPOLIA TEMPLI AT BRADFORD.—My brother sent me some fine specimens of *Dasypolia templi*, captured on October 28th, on gas lamps. The specimens were posted to me, when freshly killed, in a zinc box; they carry well in this way, and arrive in fine condition for setting.—J. A. BUTTERFIELD, B.Sc., 35, Wrottesley Road, Plumstead, S.E.

NOTE ON DREPANA BINARIA.—The present season has afforded a good illustration of how some species appear at unexpected places, if specially sought for. *D. binaria* has only been occasionally taken in this district in two or three distant localities. The early days of October yielding but little "sport" in winged captures, I decided upon making a larval raid upon the oaks within easy reach. The result has been a decided surprise. In each of five widely separated localities on the south, east, and west side of Gloucester, which I worked, the larvæ of *D. binaria* tumbled into the umbrella, not, it is true, in any great numbers, but the total yield was quite satisfactory, not so much on account of the insects themselves, as their affording a demonstration of the wide distribution of the species in districts hitherto not known to supply it. It seems likely that if the search for the larvæ had been commenced earlier, say in September, the number of captures of desirable species would have been increased. We know that larva-searching is constantly yielding species that are seldom or never met with on the wing; and doubtless this work would prove much more productive if the upper branches of trees could be conveniently got at. Could not collectors who have facilities for working out this "higher branch" of our work, give us the result of their experience regarding it, and add materially to our knowledge? Are there not many "high-flyers" besides that protean beauty, *Hypsipetes sordidata*, that love to feed as high as they fly, and might not many discoveries be made by judicious tree-climbing by ladders, etc., and the adoption of other new modes of capture?—J. MERRIN, 2, Oakleigh Villas, Gloucester.

CHORTODES MORRISII (BONDII).—This species occurs not uncommonly *at Charmouth*. Half my series I took there.—A. B. FARN, F.E.S., Mt. Nod, Greenhithe. [This is an important note from the point of view that the original specimens of *C. morrisii* (*bondii*) were captured at Charmouth, and there has recently been an attempt to show that *C. morrisii* of Charmouth is not identical with *C. bondii* from Folkestone.—ED.]

A NEW LOCALITY FOR LYCÆNA ARION.—It will interest lepidopterists to hear that, whilst on a wandering tour in Devonshire, at the end of last July, I came across this species in a new locality. The specimens were, as may be supposed from the date, very much worn, but had evidently been fairly numerous. The locality is not likely to be visited by entomologists, or even tourists, at the period of the year during which the insect is flying, and from my knowledge of the habits of the species, I should say it is likely to remain there undetected for many years.—W. G. Sheldon, Heimath, Friend's Road, Croydon.

Sale of insects.—The sale of part of the collection of Lepidoptera formed by the late Mr. J. B. Hodgkinson took place at Stevens' Auction Rooms, on Nov. 23rd, 1897. Some of the most striking lots were the following: An aberration of *Aglais urticae*, £7 10s. *Euvanessa antiopa*, 12/-, 26/-, 21/- each. *Chrysophanus dispar*, 35/-, 55/-, 16/-, 47/6, 20/-, 47/6, 37/6 each. *Polyommatus icarus*, gynandrous, 20/-. White ab. of *Zygaena lonicerae*, 22/-. One pink and five yellow abs. of *Z filipendulae*, 44/-. *Sesia allantiformis*, 9/-, 6/-, 21/- each. *Deilephila livornica*, and three *D. galii*, 16/-, 16/-, 12/-, 14/-, 18/- per lot. *Choerocampa celerio*, 20/-, 20/-, 21/-, 10/-, 22/-, and 22/- each (one of the two last vouched for by Esson, of Aberdeen). *D. euphorbiae*, 21/-. *Nola centonalis*, 27/6, 32/6 for eleven. *Deiopeia pulchella*, 22/-, 22/-, 8/-, 18/-, 12/- each. *Eulepia grammica*, the historical Wharfedale specimen, 8/- only. *Cerura bicuspis*, 11/-, 18/- for four. *Arctia caia*, £3 15s. for five aberrations. *Laelia caenosa*, 12/-, 14/-, 16/-, 17/-, 10/-, 32/-, 14/- per pair. *Notodonta bicolor* ♂, 85/-, ♀ and pupa case, 105/-. *Gastropacha ilicifolia*, ♂ 18/-, ♀ 45/-, ♂ 14/-, ♀ 18/-. *Drepana harpagula*, 16/- (two), 50/- (three), 30/- (three), 21/- (three). *Synia musculosa*, 7/-, 11/-. *Leucania albipuncta*, five for 6/-, four for 6/-. There was a lot consisting of two specimens of *Leucania vitellina*, one caught by Capt. (Mr.) A. H. Jones, at Torquay. These two specimens went for only 7/-. *Nonagria sparganii*, 9/-, 26/-, 11/- per pair. *Luperina dumerilii* (1) and *L. gueneei* (1), 20/. *Hydrilla palustris*, 22/- for 3. *Agrotis subrosea*, 50/- (2), 42/- (2), 35/- (2), 20/- (3). *Luperina luteago* ab. *barrettii*, 55/- (for four). *Xylina conformis*, 18/- (3), 21/- (3), *X. zinckenii*, 11/- and 8/- each. *Cucullia gnaphalii*, 21/-, 21/- per pair. *Heliothis scutosa*, 55/- (the "Heysham" specimen). *Catephia alchymista*, 27/6. *Plusia moneta*, bred specimens, 2/6 each. *Cleora viduaria*, 32/6, 24/-, 14/-, 14/- per pair. *Acidalia herbariata*, 22/-, 6/-. *A. circellata*, 28/-, 30/- for four. *A. perochraria*, 6/-. *Boletobia fuliginaria*, 6/-, 12/-, 8/- per pair; 18/- for four. *Abraxas grossulariata*, one light ab., 22/-. *Phibalapteryx polygrammata*, 16/-, 21/-, 21/-, 21/-, four in each lot. *Cidaria reticulata*, 12/-, 14/-, 16/-, 35/-, 37/-, 42/- for threes. *Ennychia octomaculalis*, one rayed ab., 30/-. *Diasemia ramburialis*, 26/-. *Crambus verellus*, 32/6. *Gelechia obscurella*. 20/- (two). *G. obscurella* (1), and *G. littorella* (1), 20/-. *Œcophora formosella*, 10/- (3), 8/- (3). Total for the two days' sale, £340 18s. 6d.—J. W. Tutt, F.E.S.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Pupa of Nemeobius lucina.—*Shape:* approaching that of the *Theclidi*. *Colour*: its colour is of a delicate pale wainscot-brown. *Hairs*: the whole dorsal surface is covered with brown hairs, about $\frac{3}{32}$nd. of an inch in length. *Markings*: all the markings are black, and are arranged as follows:—(1) The head is marked by an unbroken line running round it to the junction of the 1st thoracic segment on either side, and reaching below the level of the costal margins of the wing-cases. (2) The 1st thoracic segment is marked with two slightly curved lines, parallel with each other, extending to the level of the lateral series. (3) The anal segment is unmarked. (4) On the 2nd and 3rd thoracic, and first 9 abdominal segments, there is a double dorsal series of dots. (5) The lateral series are placed as follows :—(*a*) The 3rd to 9th abdominal segments have on either side three dots in line. The central very minute. (*b*) The other two of the same size as the dorsal. The 5th to 8th have a fourth minute dot, below the lower of these. (*c*) The 2nd and 3rd thoracic segments have the three dots, but the central is out of line, forming a triangle. In the 2nd the central dot points towards the first thoracic, and in the 3rd in the direction of the 1st abdominal segment. (*d*) The 1st abdominal has but two dots, the 2nd but one. (*e*) The costal margins of the wing-cases are marked by a line along their entire length. *Position and suspension :* Attached to the underside of a leaf of the food-plant by the cremaster, and by a silken thread passing over the body at the junction of the 3rd thoracic and the 1st abdominal segments.—H. L. Wood, Old Grammar School House, Ashford, Kent.

CURRENT NOTES.

Whilst we are doing our level best to protect *Porthesia* (*Euproctis*) *chrysorrhoea* from extermination in this country, our friends in Massachusetts, where the species was first noticed about five years ago, have passed an Act requiring local authorities to take immediate steps for its extinction, and to prevent its spread. France, as early as 1734, passed a law requiring landowners to destroy the caterpillars of this species, to which, *Porthetria dispar* and other species were afterwards added. As a matter of fact, in spite of the general abundance of these species in Europe, their numbers, except in occasional seasons, are never sufficient to cause really serious harm, and serve largely, when they are specially abundant, for exciting newspaper paragraphs. The *Bulletin* can be obtained from Professor Fernald, of the Mass. Agricultural College, Amherst, Mass., U.S.A.

Mr. T. P. Newman feels that the remark on p. 257 tends to throw a slight on the memory of his father. We need hardly assure our readers that no such slight was intended. The remark was based on hearsay evidence, and the recollection of letters received in the early "seventies." Mr. Newman thinks that our recollection may have been at fault, and states that, in his opinion, his father did not receive or distribute the eggs. This view is strongly supported by the statements in *Entom.*, vi., p. 33, and ix., p. 210.

We have great pleasure in informing our readers that Mr. Horace St. John K. Donisthorpe, F.Z.S., F.E.S., will, commencing with Volume X., edit a special section of the *Entomologist's Record*, devoted to Coleoptera. Coleopterists may, therefore, if they prefer, send their communications direct to Mr. Donisthorpe, at 73, West Cromwell Road, Kensington, W.

Errata.—P. 261, line 28, for "variety" read "species"; p. 240, line 47, for "*Catoptria aemulana*" read "*C. tripoliana*"; and line 49, for "*C. decolorana*" read "*C. aemulana*"; p. 281, line 2 from bottom, *E. epistygne*. This was a *lapsus calami* in the original note from which the quotation was taken for "*E. stygne*"; p. 69, line, 25, for "*Catocala pacta*" read "*Catocala parta*"; p. 292, line 9, for "*Acidalia ochrata*" read *A.* "*perochraria*."

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MEETINGS OF SOCIETIES.

Entomological Society of London, 11, Chandos Street, Cavendish Square, W.—Wednesdays.

The City of London Entomological and Natural History Society, London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month. at 7.30 p.m. Dec. 21st, "Some Cicadides," A. Quail, to be read by A. Bacot. Papers and Notes at every Meeting. Members are particularly requested to bring varieties and aberrations for exhibition. Non-members cordially invited.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m.

North London Natural History Society. Meetings on the 1st and 3rd Thursdays in each month, in Room No. 4 of the North East London Institute, Dalston Lane, N.E., from 7.45 (sharp) to 10 p.m.

Nonpareil Entomological Society, Mansfield Street, Kingsland.—The First and Third Thursdays in the Month.

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